SEQUENCE LISTING

<110> WAKITA, Takaji
      KATO, Takanobu
      DATE, Tomoko

<120> A NUCLEIC ACID CONSTRUCT CONTAINING A NUCLEIC ACID DERIVED
      FROM THE GENOME OF HEPATITIS C VIRUS (HCV) OF GENOTYPE 2a,
      AND A CELL HAVING SUCH NUCLEIC ACID CONSTRUCT INTRODUCED THEREIN

<130> 1254-0299PUS1

<140> US 10/558,155
<141> 2005-11-23

<150> PCT/JP2003/015038
<151> 2003-11-25

<150> JP 2003-148242
<151> 2003-05-26

<150> JP 2003-329115

<151> 2003-09-19

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<170> PatentIn Ver. 2.1

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<222> (341)..(9442)

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aagactgggt cctttcttgg ataaacccac tctatgcccg gccatttggg cgtgcccccg 240

caagactgct agccgagtag cgttgggttg cgaaaggcct tgtggtactg cctgataggg 300

cgcttgcgag tgccccggga ggtctcgtag accgtgcacc atg agc aca aat cct 355
                                           Met Ser Thr Asn Pro
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6

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aaa cct caa aga aaa acc aaa aga aac acc aac cgt cgc cca gaa gac    403
Lys Pro Gln Arg Lys Thr Lys Arg Asn Thr Asn Arg Arg Pro Glu Asp
            10              15              20

gtt aag ttc ccg ggc ggc ggc cag atc gtt ggc gga gta tac ttg ttg    451
Val Lys Phe Pro Gly Gly Gly Gln Ile Val Gly Gly Val Tyr Leu Leu
            25              30              35

ccg cgc agg ggc ccc agg ttg ggt gtg cgc acg aca agg aaa act tcg    499
Pro Arg Arg Gly Pro Arg Leu Gly Val Arg Thr Thr Arg Lys Thr Ser
            40              45              50

gag cgg tcc cag cca cgt ggg aga cgc cag ccc atc ccc aaa gat cgg    547
Glu Arg Ser Gln Pro Arg Gly Arg Arg Gln Pro Ile Pro Lys Asp Arg
    55              60              65

cgc tcc act ggc aag gcc tgg gga aaa cca ggt cgc ccc tgg ccc cta    595
Arg Ser Thr Gly Lys Ala Trp Gly Lys Pro Gly Arg Pro Trp Pro Leu
70              75              80              85

tat ggg aat gag gga ctc ggc tgg gca gga tgg ctc ctg tcc ccc cga    643
Tyr Gly Asn Glu Gly Leu Gly Trp Ala Gly Trp Leu Leu Ser Pro Arg
            90              95              100

ggc tct cgc ccc tcc tgg ggc ccc act gac ccc cgg cat agg tcg cgc    691
Gly Ser Arg Pro Ser Trp Gly Pro Thr Asp Pro Arg His Arg Ser Arg
            105             110             115

aac gtg ggt aaa gtc atc gac acc cta acg tgt ggc ttt gcc gac ctc    739
Asn Val Gly Lys Val Ile Asp Thr Leu Thr Cys Gly Phe Ala Asp Leu
            120             125             130

atg ggg tac atc ccc gtc gta ggc gcc ccg ctt agt ggc gcc gcc aga    787
Met Gly Tyr Ile Pro Val Val Gly Ala Pro Leu Ser Gly Ala Ala Arg
    135             140             145

gct gtc gcg cac ggc gtg aga gtc ctg gag gac ggg gtt aat tat gca    835
Ala Val Ala His Gly Val Arg Val Leu Glu Asp Gly Val Asn Tyr Ala
150             155             160             165

aca ggg aac cta ccc ggt ttc ccc ttt tct atc ttc ttg ctg gcc ctg    883
Thr Gly Asn Leu Pro Gly Phe Pro Phe Ser Ile Phe Leu Leu Ala Leu
            170             175             180

ttg tcc tgc atc acc gtt ccg gtc tct gct gcc cag gtg aag aat acc    931
Leu Ser Cys Ile Thr Val Pro Val Ser Ala Ala Gln Val Lys Asn Thr
            185             190             195

agt agc agc tac atg gtg acc aat gac tgc tcc aat gac agc atc act    979
Ser Ser Ser Tyr Met Val Thr Asn Asp Cys Ser Asn Asp Ser Ile Thr
            200             205             210

tgg cag ctc gag gct gcg gtt ctc cac gtc ccc ggg tgc gtc ccg tgc    1027
Trp Gln Leu Glu Ala Ala Val Leu His Val Pro Gly Cys Val Pro Cys
    215             220             225
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7

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gag aga gtg ggg aat acg tca cgg tgt tgg gtg cca gtc tcg cca aac    1075
Glu Arg Val Gly Asn Thr Ser Arg Cys Trp Val Pro Val Ser Pro Asn
230             235             240             245

atg gct gtg cgg cag ccc ggt gcc ctc acg cag ggt ctg cgg acg cac    1123
Met Ala Val Arg Gln Pro Gly Ala Leu Thr Gln Gly Leu Arg Thr His
            250             255             260

atc gat atg gtt gtg atg tcc gcc acc ttc tgc tct gct ctc tac gtg    1171
Ile Asp Met Val Val Met Ser Ala Thr Phe Cys Ser Ala Leu Tyr Val
            265             270             275

ggg gac ctc tgt ggc ggg gtg atg ctc gcg gcc cag gtg ttc atc gtc    1219
Gly Asp Leu Cys Gly Gly Val Met Leu Ala Ala Gln Val Phe Ile Val
        280             285             290

tcg ccg cag tac cac tgg ttt gtg caa gaa tgc aat tgc tcc atc tac    1267
Ser Pro Gln Tyr His Trp Phe Val Gln Glu Cys Asn Cys Ser Ile Tyr
    295             300             305

cct ggc acc atc act gga cac cgc atg gca tgg gac atg atg atg aac    1315
Pro Gly Thr Ile Thr Gly His Arg Met Ala Trp Asp Met Met Met Asn
310             315          .    320             325

tgg tcg ccc acg gcc acc atg atc ctg gcg tac gtg atg cgc gtc ccc    1363
Trp Ser Pro Thr Ala Thr Met Ile Leu Ala Tyr Val Met Arg Val Pro
            330             335             340

gag gtc atc ata gac atc gtt agc ggg gct cac tgg ggc gtc atg ttc    1411
Glu Val Ile Ile Asp Ile Val Ser Gly Ala His Trp Gly Val Met Phe
            345             350             355

ggc ttg gcc tac ttc tct atg cag gga gcg tgg gcg aag gtc att gtc    1459
Gly Leu Ala Tyr Phe Ser Met Gln Gly Ala Trp Ala Lys Val Ile Val
        360             365             370

atc ctt ctg ctg gcc gct ggg gtg gac gcg ggc acc acc acc gtt gga    1507
Ile Leu Leu Leu Ala Ala Gly Val Asp Ala Gly Thr Thr Thr Val Gly
    375             380             385

ggc gct gtt gca cgt tcc acc aac gtg att gcc ggc gtg ttc agc cat    1555
Gly Ala Val Ala Arg Ser Thr Asn Val Ile Ala Gly Val Phe Ser His
390             395             400             405

ggc cct cag cag aac att cag ctc att aac acc aac ggc agt tgg cac    1603
Gly Pro Gln Gln Asn Ile Gln Leu Ile Asn Thr Asn Gly Ser Trp His
            410             415             420

atc aac cgt act gcc ttg aat tgc aat gac tcc ttg aac acc ggc ttt    1651
Ile Asn Arg Thr Ala Leu Asn Cys Asn Asp Ser Leu Asn Thr Gly Phe
            425             430             435

ctc gcg gcc ttg ttc tac acc aac cgc ttt aac tcg tca ggg tgt cca    1699
Leu Ala Ala Leu Phe Tyr Thr Asn Arg Phe Asn Ser Ser Gly Cys Pro
        440             445             450

ggg cgc ctg tcc gcc tgc cgc aac atc gag gct ttc cgg ata ggg tgg    1747
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8

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Gly Arg Leu Ser Ala Cys Arg Asn Ile Glu Ala Phe Arg Ile Gly Trp
    455                 460                 465

ggc acc cta cag tac gag gat aat gtc acc aat cca gag gat atg agg    1795
Gly Thr Leu Gln Tyr Glu Asp Asn Val Thr Asn Pro Glu Asp Met Arg
470                 475                 480                 485

ccg tac tgc tgg cac tac ccc cca aag ccg tgt ggc gta gtc ccc gcg    1843
Pro Tyr Cys Trp His Tyr Pro Pro Lys Pro Cys Gly Val Val Pro Ala
                490                 495                 500

agg tct gtg tgt ggc cca gtg tac tgt ttc acc ccc agc ccg gta gta    1891
Arg Ser Val Cys Gly Pro Val Tyr Cys Phe Thr Pro Ser Pro Val Val
                505                 510                 515

gtg ggc acg acc gac aga cgt gga gtg ccc acc tac aca tgg gga gag    1939
Val Gly Thr Thr Asp Arg Arg Gly Val Pro Thr Tyr Thr Trp Gly Glu
        520                 525                 530

aat gag aca gat gtc ttc cta ctg aac agc acc cga ccg ccg cag ggc    1987
Asn Glu Thr Asp Val Phe Leu Leu Asn Ser Thr Arg Pro Pro Gln Gly
    535                 540                 545

tca tgg ttc ggc tgc acg tgg atg aac tcc act ggt ttc acc aag act    2035
Ser Trp Phe Gly Cys Thr Trp Met Asn Ser Thr Gly Phe Thr Lys Thr
550                 555                 560                 565

tgt ggc gcg cca cct tgc cgc acc aga gct gac ttc aac gcc agc acg    2083
Cys Gly Ala Pro Pro Cys Arg Thr Arg Ala Asp Phe Asn Ala Ser Thr
                570                 575                 580

gac ttg ttg tgc cct acg gat tgt ttt agg aag cat cct gat gcc act    2131
Asp Leu Leu Cys Pro Thr Asp Cys Phe Arg Lys His Pro Asp Ala Thr
                585                 590                 595

tat att aag tgt ggt tct ggg ccc tgg ctc aca cca aag tgc ctg gtc    2179
Tyr Ile Lys Cys Gly Ser Gly Pro Trp Leu Thr Pro Lys Cys Leu Val
                600                 605                 610

cac tac cct tac aga ctc tgg cat tac ccc tgc aca gtc aat ttt acc    2227
His Tyr Pro Tyr Arg Leu Trp His Tyr Pro Cys Thr Val Asn Phe Thr
        615                 620                 625

atc ttc aag ata aga atg tat gta ggg ggg gtt gag cac agg ctc acg    2275
Ile Phe Lys Ile Arg Met Tyr Val Gly Gly Val Glu His Arg Leu Thr
630                 635                 640                 645

gcc gca tgc aac ttc act cgt ggg gat cgc tgc gac ttg gag gac agg    2323
Ala Ala Cys Asn Phe Thr Arg Gly Asp Arg Cys Asp Leu Glu Asp Arg
                650                 655                 660

gac agg agt cag ctg tct cct ctg ttg cac tct acc acg gaa tgg gcc    2371
Asp Arg Ser Gln Leu Ser Pro Leu Leu His Ser Thr Thr Glu Trp Ala
                665                 670                 675

atc ctg ccc tgc acc tac tca gac tta ccc gct ttg tca act ggt ctt    2419
Ile Leu Pro Cys Thr Tyr Ser Asp Leu Pro Ala Leu Ser Thr Gly Leu
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9

ctc cac ctt cac cag aac atc gtg gac gta caa tac atg tat ggc ctc   2467
Leu His Leu His Gln Asn Ile Val Asp Val Gln Tyr Met Tyr Gly Leu
    695   700   705

tca cct gct atc aca aaa tac gtc gtt cga tgg gag tgg gtg gta ctc   2515
Ser Pro Ala Ile Thr Lys Tyr Val Val Arg Trp Glu Trp Val Val Leu
710   715   720   725

tta ttc ctg ctc tta gcg gac gcc aga gtc tgc gcc tgc ttg tgg atg   2563
Leu Phe Leu Leu Leu Ala Asp Ala Arg Val Cys Ala Cys Leu Trp Met
                730   735   740

ctc atc ttg ttg ggc cag gcc gaa gca gca ttg gag aag ttg gtc gtc   2611
Leu Ile Leu Leu Gly Gln Ala Glu Ala Ala Leu Glu Lys Leu Val Val
                745   750   755

ttg cac gct gcg agt gcg gct aac tgc cat ggc ctc cta tat ttt gcc   2659
Leu His Ala Ala Ser Ala Ala Asn Cys His Gly Leu Leu Tyr Phe Ala
                760   765   770

atc ttc ttc gtg gca gct tgg cac atc agg ggt cgg gtg gtc ccc ttg   2707
Ile Phe Phe Val Ala Ala Trp His Ile Arg Gly Arg Val Val Pro Leu
    775   780   785

acc acc tat tgc ctc act ggc cta tgg ccc ttc tgc cta ctg ctc atg   2755
Thr Thr Tyr Cys Leu Thr Gly Leu Trp Pro Phe Cys Leu Leu Leu Met
790   795   800   805

gca ctg ccc cgg cag gct tat gcc tat gac gca cct gtg cac gga cag   2803
Ala Leu Pro Arg Gln Ala Tyr Ala Tyr Asp Ala Pro Val His Gly Gln
                810   815   820

ata ggc gtg ggt ttg ttg ata ttg atc acc ctc ttc aca ctc acc ccg   2851
Ile Gly Val Gly Leu Leu Ile Leu Ile Thr Leu Phe Thr Leu Thr Pro
                825   830   835

ggg tat aag acc ctc ctc ggc cag tgt ctg tgg tgg ttg tgc tat ctc   2899
Gly Tyr Lys Thr Leu Leu Gly Gln Cys Leu Trp Trp Leu Cys Tyr Leu
                840   845   850

ctg acc ctg ggg gaa gcc atg att cag gag tgg gta cca ccc atg cag   2947
Leu Thr Leu Gly Glu Ala Met Ile Gln Glu Trp Val Pro Pro Met Gln
    855   860   865

gtg cgc ggc ggc cgc gat ggc atc gcg tgg gcc gtc act ata ttc tgc   2995
Val Arg Gly Gly Arg Asp Gly Ile Ala Trp Ala Val Thr Ile Phe Cys
870   875   880   885

ccg ggt gtg gtg ttt gac att acc aaa tgg ctt ttg gcg ttg ctt ggg   3043
Pro Gly Val Val Phe Asp Ile Thr Lys Trp Leu Leu Ala Leu Leu Gly
                890   895   900

cct gct tac ctc tta agg gcc gct ttg aca cat gtg ccg tac ttc gtc   3091
Pro Ala Tyr Leu Leu Arg Ala Ala Leu Thr His Val Pro Tyr Phe Val
    905   910   915

10

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aga gct cac gct ctg ata agg gta tgc gct ttg gtg aag cag ctc gcg     3139
Arg Ala His Ala Leu Ile Arg Val Cys Ala Leu Val Lys Gln Leu Ala
        920                 925                 930

ggg ggt agg tat gtt cag gtg gcg cta ttg gcc ctt ggc agg tgg act     3187
Gly Gly Arg Tyr Val Gln Val Ala Leu Leu Ala Leu Gly Arg Trp Thr
        935                 940                 945

ggc acc tac atc tat gac cac ctc aca cct atg tcg gac tgg gcc gct     3235
Gly Thr Tyr Ile Tyr Asp His Leu Thr Pro Met Ser Asp Trp Ala Ala
950                 955                 960                 965

agc ggc ctg cgc gac tta gcg gtc gcc gtg gaa ccc atc atc ttc agt     3283
Ser Gly Leu Arg Asp Leu Ala Val Ala Val Glu Pro Ile Ile Phe Ser
                970                 975                 980

ccg atg gag aag aag gtc atc gtc tgg gga gcg gag acg gct gca tgt     3331
Pro Met Glu Lys Lys Val Ile Val Trp Gly Ala Glu Thr Ala Ala Cys
                985                 990                 995

ggg gac att cta cat gga ctt ccc gtg tcc gcc cga ctc ggc cag gag     3379
Gly Asp Ile Leu His Gly Leu Pro Val Ser Ala Arg Leu Gly Gln Glu
        1000                1005                1010

atc ctc ctc ggc cca gct gat ggc tac acc tcc aag ggg tgg aag ctc     3427
Ile Leu Leu Gly Pro Ala Asp Gly Tyr Thr Ser Lys Gly Trp Lys Leu
        1015                1020                1025

ctt gct ccc atc act gct tat gcc cag caa aca cga ggc ctc ctg ggc     3475
Leu Ala Pro Ile Thr Ala Tyr Ala Gln Gln Thr Arg Gly Leu Leu Gly
1030                1035                1040                1045

gcc ata gtg gtg agt atg acg ggg cgt gac agg aca gaa cag gcc ggg     3523
Ala Ile Val Val Ser Met Thr Gly Arg Asp Arg Thr Glu Gln Ala Gly
                1050                1055                1060

gaa gtc caa atc ctg tcc aca gtc tct cag tcc ttc ctc gga aca acc     3571
Glu Val Gln Ile Leu Ser Thr Val Ser Gln Ser Phe Leu Gly Thr Thr
                1065                1070                1075

atc tcg ggg gtt ttg tgg act gtt tac cac gga gct ggc aac aag act     3619
Ile Ser Gly Val Leu Trp Thr Val Tyr His Gly Ala Gly Asn Lys Thr
        1080                1085                1090

cta gcc ggc tta cgg ggt ccg gtc acg cag atg tac tcg agt gct gag     3667
Leu Ala Gly Leu Arg Gly Pro Val Thr Gln Met Tyr Ser Ser Ala Glu
    1095                1100                1105

ggg gac ttg gta ggc tgg ccc agc ccc cct ggg acc aag tct ttg gag     3715
Gly Asp Leu Val Gly Trp Pro Ser Pro Pro Gly Thr Lys Ser Leu Glu
1110                1115                1120                1125

ccg tgc aag tgt gga gcc gtc gac cta tat ctg gtc acg cgg aac gct     3763
Pro Cys Lys Cys Gly Ala Val Asp Leu Tyr Leu Val Thr Arg Asn Ala
                1130                1135                1140
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11

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gat gtc atc ccg gct cgg aga cgc ggg gac aag cgg gga gca ttg ctc     3811
Asp Val Ile Pro Ala Arg Arg Arg Gly Asp Lys Arg Gly Ala Leu Leu
            1145             1150             1155

tcc ccg aga ccc att tcg acc ttg aag ggg tcc tcg ggg ggg ccg gtg     3859
Ser Pro Arg Pro Ile Ser Thr Leu Lys Gly Ser Ser Gly Gly Pro Val
            1160             1165             1170

ctc tgc cct agg ggc cac gtc gtt ggg ctc ttc cga gca gct gtg tgc     3907
Leu Cys Pro Arg Gly His Val Val Gly Leu Phe Arg Ala Ala Val Cys
            1175             1180             1185

tct cgg ggc gtg gcc aaa tcc atc gat ttc atc ccc gtt gag aca ctc     3955
Ser Arg Gly Val Ala Lys Ser Ile Asp Phe Ile Pro Val Glu Thr Leu
1190             1195             1200             1205

gac gtt gtt aca agg tct ccc act ttc agt gac aac agc acg cca ccg     4003
Asp Val Val Thr Arg Ser Pro Thr Phe Ser Asp Asn Ser Thr Pro Pro
            1210             1215             1220

gct gtg ccc cag acc tat cag gtc ggg tac ttg cat gct cca act ggc     4051
Ala Val Pro Gln Thr Tyr Gln Val Gly Tyr Leu His Ala Pro Thr Gly
            1225             1230             1235

agt gga aag agc acc aag gtc cct gtc gcg tat gcc gcc cag ggg tac     4099
Ser Gly Lys Ser Thr Lys Val Pro Val Ala Tyr Ala Ala Gln Gly Tyr
            1240             1245             1250

aaa gta cta gtg ctt aac ccc tcg gta gct gcc acc ctg ggg ttt ggg     4147
Lys Val Leu Val Leu Asn Pro Ser Val Ala Ala Thr Leu Gly Phe Gly
            1255             1260             1265

gcg tac cta tcc aag gca cat ggc atc aat ccc aac att agg act gga     4195
Ala Tyr Leu Ser Lys Ala His Gly Ile Asn Pro Asn Ile Arg Thr Gly
1270             1275             1280             1285

gtc agg acc gtg atg acc ggg gag gcc atc acg tac tcc aca tat ggc     4243
Val Arg Thr Val Met Thr Gly Glu Ala Ile Thr Tyr Ser Thr Tyr Gly
            1290             1295             1300

aaa ttt ctc gcc gat ggg ggc tgc gct agc ggc gcc tat gac atc atc     4291
Lys Phe Leu Ala Asp Gly Gly Cys Ala Ser Gly Ala Tyr Asp Ile Ile
            1305             1310             1315

ata tgc gat gaa tgc cac gct gtg gat gct acc tcc att ctc ggc atc     4339
Ile Cys Asp Glu Cys His Ala Val Asp Ala Thr Ser Ile Leu Gly Ile
            1320             1325             1330

gga acg gtc ctt gat caa gca gag aca gcc ggg gtc aga cta act gtg     4387
Gly Thr Val Leu Asp Gln Ala Glu Thr Ala Gly Val Arg Leu Thr Val
            1335             1340             1345

ctg gct acg gcc aca ccc ccc ggg tca gtg aca acc ccc cat ccc gat     4435
Leu Ala Thr Ala Thr Pro Pro Gly Ser Val Thr Thr Pro His Pro Asp
1350             1355             1360             1365

ata gaa gag gta ggc ctc ggg cgg gag ggt gag atc ccc ttc tat ggg     4483
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12

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Ile Glu Glu Val Gly Leu Gly Arg Glu Gly Glu Ile Pro Phe Tyr Gly
          1370               1375               1380

agg gcg att ccc cta tcc tgc atc aag gga ggg aga cac ctg att ttc    4531
Arg Ala Ile Pro Leu Ser Cys Ile Lys Gly Gly Arg His Leu Ile Phe
          1385               1390               1395

tgc cac tca aag aaa aag tgt gac gag ctc gcg gcg gcc ctt cgg ggc    4579
Cys His Ser Lys Lys Lys Cys Asp Glu Leu Ala Ala Ala Leu Arg Gly
          1400               1405               1410

atg ggc ttg aat gcc gtg gca tac tat aga ggg ttg gac gtc tcc ata    4627
Met Gly Leu Asn Ala Val Ala Tyr Tyr Arg Gly Leu Asp Val Ser Ile
        1415               1420               1425

ata cca gct cag gga gat gtg gtg gtc gtc gcc acc gac gcc ctc atg    4675
Ile Pro Ala Gln Gly Asp Val Val Val Ala Thr Asp Ala Leu Met
1430               1435               1440               1445

acg ggg tac act gga gac ttt gac tcc gtg atc gac tgc aat gta gcg    4723
Thr Gly Tyr Thr Gly Asp Phe Asp Ser Val Ile Asp Cys Asn Val Ala
               1450               1455               1460

gtc acc caa gct gtc gac ttc agc ctg gac ccc acc ttc act ata acc    4771
Val Thr Gln Ala Val Asp Phe Ser Leu Asp Pro Thr Phe Thr Ile Thr
             1465               1470               1475

aca cag act gtc cca caa gac gct gtc tca cgc agt cag cgc cgc ggg    4819
Thr Gln Thr Val Pro Gln Asp Ala Val Ser Arg Ser Gln Arg Arg Gly
          1480               1485               1490

cgc aca ggt aga gga aga cag ggc act tat agg tat gtt tcc act ggt    4867
Arg Thr Gly Arg Gly Arg Gln Gly Thr Tyr Arg Tyr Val Ser Thr Gly
      1495               1500               1505

gaa cga gcc tca gga atg ttt gac agt gta gtg ctt tgt gag tgc tac    4915
Glu Arg Ala Ser Gly Met Phe Asp Ser Val Val Leu Cys Glu Cys Tyr
1510               1515               1520               1525

gac gca ggg gct gcg tgg tac gat ctc aca cca gcg gag acc acc gtc    4963
Asp Ala Gly Ala Ala Trp Tyr Asp Leu Thr Pro Ala Glu Thr Thr Val
          1530               1535               1540

agg ctt aga gcg tat ttc aac acg ccc ggc cta ccc gtg tgt caa gac    5011
Arg Leu Arg Ala Tyr Phe Asn Thr Pro Gly Leu Pro Val Cys Gln Asp
          1545               1550               1555

cat ctt gaa ttt tgg gag gca gtt ttc acc ggc ctc aca cac ata gac    5059
His Leu Glu Phe Trp Glu Ala Val Phe Thr Gly Leu Thr His Ile Asp
          1560               1565               1570

gcc cac ttc ctc tcc caa aca aag caa gcg ggg gag aac ttc gcg tac    5107
Ala His Phe Leu Ser Gln Thr Lys Gln Ala Gly Glu Asn Phe Ala Tyr
      1575               1580               1585

cta gta gcc tac caa gct acg gtg tgc gcc aga gcc aag gcc cct ccc    5155
Leu Val Ala Tyr Gln Ala Thr Val Cys Ala Arg Ala Lys Ala Pro Pro
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ccg tcc tgg gac gcc atg tgg aag tgc ctg gcc cga ctc aag cct acg    5203
Pro Ser Trp Asp Ala Met Trp Lys Cys Leu Ala Arg Leu Lys Pro Thr
            1610                1615                1620

ctt gcg ggc ccc aca cct ctc ctg tac cgt ttg ggc cct att acc aat    5251
Leu Ala Gly Pro Thr Pro Leu Leu Tyr Arg Leu Gly Pro Ile Thr Asn
            1625                1630                1635

gag gtc acc ctc aca cac cct ggg acg aag tac atc gcc aca tgc atg    5299
Glu Val Thr Leu Thr His Pro Gly Thr Lys Tyr Ile Ala Thr Cys Met
        1640                1645                1650

caa gct gac ctt gag gtc atg acc agc acg tgg gtc cta gct gga gga    5347
Gln Ala Asp Leu Glu Val Met Thr Ser Thr Trp Val Leu Ala Gly Gly
    1655                1660                1665

gtc ctg gca gcc gtc gcc gca tat tgc ctg gcg act gga tgc gtt tcc    5395
Val Leu Ala Ala Val Ala Ala Tyr Cys Leu Ala Thr Gly Cys Val Ser
1670                1675                1680                1685

atc atc ggc cgc ttg cac gtc aac cag cga gtc gtc gtt gcg ccg gat    5443
Ile Ile Gly Arg Leu His Val Asn Gln Arg Val Val Val Ala Pro Asp
            1690                1695                1700

aag gag gtc ctg tat gag gct ttt gat gag atg gag gaa tgc gcc tct    5491
Lys Glu Val Leu Tyr Glu Ala Phe Asp Glu Met Glu Glu Cys Ala Ser
            1705                1710                1715

agg gcg gct ctc atc gaa gag ggg cag cgg ata gcc gag atg ttg aag    5539
Arg Ala Ala Leu Ile Glu Glu Gly Gln Arg Ile Ala Glu Met Leu Lys
        1720                1725                1730

tcc aag atc caa ggc ttg ctg cag cag gcc tct aag cag gcc cag gac    5587
Ser Lys Ile Gln Gly Leu Leu Gln Gln Ala Ser Lys Gln Ala Gln Asp
    1735                1740                1745

ata caa ccc gct atg cag gct tca tgg ccc aaa gtg gaa caa ttt tgg    5635
Ile Gln Pro Ala Met Gln Ala Ser Trp Pro Lys Val Glu Gln Phe Trp
1750                1755                1760                1765

gcc aga cac atg tgg aac ttc att agc ggc atc caa tac ctc gca gga    5683
Ala Arg His Met Trp Asn Phe Ile Ser Gly Ile Gln Tyr Leu Ala Gly
            1770                1775                1780

ttg tca aca ctg cca ggg aac ccc gcg gtg gct tcc atg atg gca ttc    5731
Leu Ser Thr Leu Pro Gly Asn Pro Ala Val Ala Ser Met Met Ala Phe
            1785                1790                1795

agt gcc gcc ctc acc agt ccg ttg tcg acc agt acc acc atc ctt ctc    5779
Ser Ala Ala Leu Thr Ser Pro Leu Ser Thr Ser Thr Thr Ile Leu Leu
        1800                1805                1810

aac atc atg gga ggc tgg tta gcg tcc cag atc gca cca ccc gcg ggg    5827
Asn Ile Met Gly Gly Trp Leu Ala Ser Gln Ile Ala Pro Pro Ala Gly
    1815                1820                1825
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gcc acc ggc ttt gtc gtc agt ggc ctg gtg ggg gct gcc gtg ggc agc      5875
Ala Thr Gly Phe Val Val Ser Gly Leu Val Gly Ala Ala Val Gly Ser
1830            1835                1840                1845


ata ggc ctg ggt aag gtg ctg gtg gac atc ctg gca gga tat ggt gcg      5923
Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu Ala Gly Tyr Gly Ala
            1850                1855                1860


ggc att tcg ggg gcc ctc gtc gca ttc aag atc atg tct ggc gag aag      5971
Gly Ile Ser Gly Ala Leu Val Ala Phe Lys Ile Met Ser Gly Glu Lys
        1865                1870                1875


ccc tct atg gaa gat gtc atc aat cta ctg cct ggg atc ctg tct ccg      6019
Pro Ser Met Glu Asp Val Ile Asn Leu Leu Pro Gly Ile Leu Ser Pro
        1880                1885                1890


gga gcc ctg gtg gtg ggg gtc atc tgc gcg gcc att ctg cgc cgc cac      6067
Gly Ala Leu Val Val Gly Val Ile Cys Ala Ala Ile Leu Arg Arg His
     1895                1900                1905


gtg gga ccg ggg gag ggc gcg gtc caa tgg atg aac agg ctt att gcc      6115
Val Gly Pro Gly Glu Gly Ala Val Gln Trp Met Asn Arg Leu Ile Ala
1910            1915                1920                1925


ttt gct tcc aga gga aac cac gtc gcc cct act cac tac gtg acg gag      6163
Phe Ala Ser Arg Gly Asn His Val Ala Pro Thr His Tyr Val Thr Glu
            1930                1935                1940


tcg gat gcg tcg cag cgt gtg acc caa cta ctt ggc tct ctt act ata      6211
Ser Asp Ala Ser Gln Arg Val Thr Gln Leu Leu Gly Ser Leu Thr Ile
        1945                1950                1955


acc agc cta ctc aga aga ctc cac aat tgg ata act gag gac tgc ccc      6259
Thr Ser Leu Leu Arg Arg Leu His Asn Trp Ile Thr Glu Asp Cys Pro
        1960                1965                1970


atc cca tgc tcc gga tcc tgg ctc cgc gac gtg tgg gac tgg gtt tgc      6307
Ile Pro Cys Ser Gly Ser Trp Leu Arg Asp Val Trp Asp Trp Val Cys

    1975                1980                1985


acc atc ttg aca gac ttc aaa aat tgg ctg acc tct aaa ttg ttc ccc      6355
Thr Ile Leu Thr Asp Phe Lys Asn Trp Leu Thr Ser Lys Leu Phe Pro
1990            1995                2000                2005


aag ctg ccc ggc ctc ccc ttc atc tct tgt caa aag ggg tac aag ggt      6403
Lys Leu Pro Gly Leu Pro Phe Ile Ser Cys Gln Lys Gly Tyr Lys Gly
            2010                2015                2020


gtg tgg gcc ggc act ggc atc atg acc acg cgc tgc cct tgc ggc gcc      6451
Val Trp Ala Gly Thr Gly Ile Met Thr Thr Arg Cys Pro Cys Gly Ala
            2025                2030                2035


aac atc tct ggc aat gtc cgc ctg ggc tct atg agg atc aca ggg cct      6499
Asn Ile Ser Gly Asn Val Arg Leu Gly Ser Met Arg Ile Thr Gly Pro
        2040                2045                2050
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15

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aaa acc tgc atg aac acc tgg cag ggg acc ttt cct atc aat tgc tac    6547
Lys Thr Cys Met Asn Thr Trp Gln Gly Thr Phe Pro Ile Asn Cys Tyr
   2055                2060                2065


acg gag ggc cag tgc gcg ccg aaa ccc ccc acg aac tac aag acc gcc    6595
Thr Glu Gly Gln Cys Ala Pro Lys Pro Pro Thr Asn Tyr Lys Thr Ala
2070                2075                2080                2085


atc tgg agg gtg gcg gcc tcg gag tac gcg gag gtg acg cag cat ggg    6643
Ile Trp Arg Val Ala Ala Ser Glu Tyr Ala Glu Val Thr Gln His Gly
             2090                2095                2100


tcg tac tcc tat gta aca gga ctg acc act gac aat ctg aaa att cct    6691
Ser Tyr Ser Tyr Val Thr Gly Leu Thr Thr Asp Asn Leu Lys Ile Pro
          2105                2110                2115


tgc caa cta cct tct cca gag ttt ttc tcc tgg gtg gac ggt gtg cag    6739
Cys Gln Leu Pro Ser Pro Glu Phe Phe Ser Trp Val Asp Gly Val Gln
       2120                2125                2130


atc cat agg ttt gca ccc aca cca aag ccg ttt ttc cgg gat gag gtc    6787
Ile His Arg Phe Ala Pro Thr Pro Lys Pro Phe Phe Arg Asp Glu Val
   2135                2140                2145


tcg ttc tgc gtt ggg ctt aat tcc tat gct gtc ggg tcc cag ctt ccc    6835
Ser Phe Cys Val Gly Leu Asn Ser Tyr Ala Val Gly Ser Gln Leu Pro
2150                2155                2160                2165


tgt gaa cct gag ccc gac gca gac gta ttg agg tcc atg cta aca gat    6883
Cys Glu Pro Glu Pro Asp Ala Asp Val Leu Arg Ser Met Leu Thr Asp
             2170                2175                2180


ccg ccc cac atc acg gcg gag act gcg gcg cgg cgc ttg gca cgg gga    6931
Pro Pro His Ile Thr Ala Glu Thr Ala Ala Arg Arg Leu Ala Arg Gly
          2185                2190                2195


tca cct cca tct gag gcg agc tcc tca gtg agc cag cta tca gca ccg    6979
Ser Pro Pro Ser Glu Ala Ser Ser Ser Val Ser Gln Leu Ser Ala Pro
       2200                2205                2210


tcg ctg cgg gcc acc tgc acc acc cac agc aac acc tat gac gtg gac    7027
Ser Leu Arg Ala Thr Cys Thr Thr His Ser Asn Thr Tyr Asp Val Asp
   2215                2220                2225


atg gtc gat gcc aac ctg ctc atg gag ggc ggt gtg gct cag aca gag    7075
Met Val Asp Ala Asn Leu Leu Met Glu Gly Gly Val Ala Gln Thr Glu
2230                2235                2240                2245


cct gag tcc agg gtg ccc gtt ctg gac ttt ctc gag cca atg gcc gag    7123
Pro Glu Ser Arg Val Pro Val Leu Asp Phe Leu Glu Pro Met Ala Glu
             2250                2255        .        2260


gaa gag agc gac ctt gag ccc tca ata cca tcg gag tgc atg ctc ccc    7171
Glu Glu Ser Asp Leu Glu Pro Ser Ile Pro Ser Glu Cys Met Leu Pro
          2265                2270                2275
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agg agc ggg ttt cca cgg gcc tta ccg gct tgg gca cgg cct gac tac    7219
Arg Ser Gly Phe Pro Arg Ala Leu Pro Ala Trp Ala Arg Pro Asp Tyr
        2280            2285            2290

aac ccg ccg ctc gtg gaa tcg tgg agg agg cca gat tac caa ccg ccc    7267
Asn Pro Pro Leu Val Glu Ser Trp Arg Arg Pro Asp Tyr Gln Pro Pro
    2295            2300            2305

acc gtt gct ggt tgt gct ctc ccc ccc ccc aag aag gcc ccg acg cct    7315
Thr Val Ala Gly Cys Ala Leu Pro Pro Pro Lys Lys Ala Pro Thr Pro
2310            2315            2320            2325

ccc cca agg aga cgc cgg aca gtg ggt ctg agc gag agc acc ata tca    7363
Pro Pro Arg Arg Arg Arg Thr Val Gly Leu Ser Glu Ser Thr Ile Ser
            2330            2335            2340

gaa gcc ctc cag caa ctg gcc atc aag acc ttt ggc cag ccc ccc tcg    7411
Glu Ala Leu Gln Gln Leu Ala Ile Lys Thr Phe Gly Gln Pro Pro Ser
            2345            2350            2355

agc ggt gat gca ggc tcg tcc acg ggg gcg ggc gcc gcc gaa tcc ggc    7459
Ser Gly Asp Ala Gly Ser Ser Thr Gly Ala Gly Ala Ala Glu Ser Gly
        2360            2365            2370

ggt ccg acg tcc cct ggt gag ccg gcc ccc tca gag aca ggt tcc gcc    7507
Gly Pro Thr Ser Pro Gly Glu Pro Ala Pro Ser Glu Thr Gly Ser Ala
    2375            2380            2385

tcc tct atg ccc ccc ctc gag ggg gag cct gga gat ccg gac ctg gag    7555
Ser Ser Met Pro Pro Leu Glu Gly Glu Pro Gly Asp Pro Asp Leu Glu
2390            2395            2400            2405

tct gat cag gta gag ctt caa cct ccc ccc cag ggg ggg ggg gta gct    7603
Ser Asp Gln Val Glu Leu Gln Pro Pro Pro Gln Gly Gly Gly Val Ala
            2410            2415            2420

ccc ggt tcg ggc tcg ggg tct tgg tct act tgc tcc gag gag gac gat    7651
Pro Gly Ser Gly Ser Gly Ser Trp Ser Thr Cys Ser Glu Glu Asp Asp
            2425            2430            2435

acc acc gtg tgc tgc tcc atg tca tac tcc tgg acc ggg gct cta ata    7699
Thr Thr Val Cys Cys Ser Met Ser Tyr Ser Trp Thr Gly Ala Leu Ile
        2440            2445            2450

act ccc tgt agc ccc gaa gag gaa aag ttg cca atc aac cct ttg agt    7747
Thr Pro Cys Ser Pro Glu Glu Glu Lys Leu Pro Ile Asn Pro Leu Ser
    2455            2460            2465

aac tcg ctg ttg cga tac cat aac aag gtg tac tgt aca aca tca aag    7795
Asn Ser Leu Leu Arg Tyr His Asn Lys Val Tyr Cys Thr Thr Ser Lys
2470              . 2475            2480            2485

agc gcc tca cag agg gct aaa aag gta act ttt gac agg acg caa gtg    7843
Ser Ala Ser Gln Arg Ala Lys Lys Val Thr Phe Asp Arg Thr Gln Val
            2490            2495            2500

ctc gac gcc cat tat gac tca gtc tta aag gac atc aag cta gcg gct    7891
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17

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Leu Asp Ala His Tyr Asp Ser Val Leu Lys Asp Ile Lys Leu Ala Ala
        2505                2510                2515

tcc aag gtc agc gca agg ctc ctc acc ttg gag gag gcg tgc cag ttg    7939
Ser Lys Val Ser Ala Arg Leu Leu Thr Leu Glu Glu Ala Cys Gln Leu
        2520                2525                2530

act cca ccc cat tct gca aga tcc aag tat gga ttc ggg gcc aag gag    7987
Thr Pro Pro His Ser Ala Arg Ser Lys Tyr Gly Phe Gly Ala Lys Glu
    2535                2540                2545

gtc cgc agc ttg tcc ggg agg gcc gtt aac cac atc aag tcc gtg tgg    8035
Val Arg Ser Leu Ser Gly Arg Ala Val Asn His Ile Lys Ser Val Trp
2550                2555                2560                2565

aag gac ctc ctg gaa gac cca caa aca cca att ccc aca acc atc atg    8083
Lys Asp Leu Leu Glu Asp Pro Gln Thr Pro Ile Pro Thr Thr Ile Met
            2570                2575                2580

gcc aaa aat gag gtg ttc tgc gtg gac ccc gcc aag ggg ggt aag aaa    8131
Ala Lys Asn Glu Val Phe Cys Val Asp Pro Ala Lys Gly Gly Lys Lys
        2585                2590                2595

cca gct cgc ctc atc gtt tac cct gac ctc ggc gtc cgg gtc tgc gag    8179
Pro Ala Arg Leu Ile Val Tyr Pro Asp Leu Gly Val Arg Val Cys Glu
        2600                2605                2610

aaa atg gcc ctc tat gac att aca caa aag ctt cct cag gcg gta atg    8227
Lys Met Ala Leu Tyr Asp Ile Thr Gln Lys Leu Pro Gln Ala Val Met
    2615                2620                2625

gga gct tcc tat ggc ttc cag tac tcc cct gcc caa cgg gtg gag tat    8275
Gly Ala Ser Tyr Gly Phe Gln Tyr Ser Pro Ala Gln Arg Val Glu Tyr
2630                2635                2640                2645

ctc ttg aaa gca tgg gcg gaa aag aag gac ccc atg ggt ttt tcg tat    8323
Leu Leu Lys Ala Trp Ala Glu Lys Lys Asp Pro Met Gly Phe Ser Tyr
            2650                2655                2660

gat acc cga tgc ttc gac tca acc gtc act gag aga gac atc agg acc    8371
Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Arg Asp Ile Arg Thr
            2665                2670                2675

gag gag tcc ata tac cag gcc tgc tcc ctg ccc gag gag gcc cgc act    8419
Glu Glu Ser Ile Tyr Gln Ala Cys Ser Leu Pro Glu Glu Ala Arg Thr
        2680                2685                2690

gcc ata cac tcg ctg act gag aga ctt tac gta gga ggg ccc atg ttc    8467
Ala Ile His Ser Leu Thr Glu Arg Leu Tyr Val Gly Gly Pro Met Phe
    2695                2700                2705

aac agc aag ggt caa acc tgc ggt tac aga cgt tgc cgc gcc agc ggg    8515
Asn Ser Lys Gly Gln Thr Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly
2710                2715                2720                2725

gtg cta acc act agc atg ggt aac acc atc aca tgc tat gtg aaa gcc    8563
Val Leu Thr Thr Ser Met Gly Asn Thr Ile Thr Cys Tyr Val Lys Ala
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cta gcg gcc tgc aag gct gcg ggg ata gtt gcg ccc aca atg ctg gta     8611
Leu Ala Ala Cys Lys Ala Ala Gly Ile Val Ala Pro Thr Met Leu Val
         2745                2750                2755

tgc ggc gat gac cta gta gtc atc tca gaa agc cag ggg act gag gag     8659
Cys Gly Asp Asp Leu Val Val Ile Ser Glu Ser Gln Gly Thr Glu Glu
      2760                2765                2770

gac gag cgg aac ctg aga gcc ttc acg gag gcc atg acc agg tac tct     8707
Asp Glu Arg Asn Leu Arg Ala Phe Thr Glu Ala Met Thr Arg Tyr Ser
   2775                2780                2785

gcc cct cct ggt gat ccc ccc aga ccg gaa tat gac ctg gag cta ata     8755
Ala Pro Pro Gly Asp Pro Pro Arg Pro Glu Tyr Asp Leu Glu Leu Ile
2790                2795                2800                2805

aca tcc tgt tcc tca aat gtg tct gtg gcg ttg ggc ccg cgg ggc cgc     8803
Thr Ser Cys Ser Ser Asn Val Ser Val Ala Leu Gly Pro Arg Gly Arg
            2810                2815                2820

cgc aga tac tac ctg acc aga gac cca acc act cca ctc gcc cgg gct     8851
Arg Arg Tyr Tyr Leu Thr Arg Asp Pro Thr Thr Pro Leu Ala Arg Ala
            2825                2830                2835

gcc tgg gaa aca gtt aga cac tcc cct atc aat tca tgg ctg gga aac     8899
Ala Trp Glu Thr Val Arg His Ser Pro Ile Asn Ser Trp Leu Gly Asn
      2840                2845                2850

atc atc cag tat gct cca acc ata tgg gtt cgc atg gtc cta atg aca     8947
Ile Ile Gln Tyr Ala Pro Thr Ile Trp Val Arg Met Val Leu Met Thr
   2855                2860                2865

cac ttc ttc tcc att ctc atg gtc caa gac acc ctg gac cag aac ctc     8995
His Phe Phe Ser Ile Leu Met Val Gln Asp Thr Leu Asp Gln Asn Leu
2870                2875                2880                2885

aac ttt gag atg tat gga tca gta tac tcc gtg aat cct ttg gac ctt     9043
Asn Phe Glu Met Tyr Gly Ser Val Tyr Ser Val Asn Pro Leu Asp Leu
            2890                2895                2900

cca gcc ata att gag agg tta cac ggg ctt gac gcc ttt tct atg cac     9091
Pro Ala Ile Ile Glu Arg Leu His Gly Leu Asp Ala Phe Ser Met His
            2905                2910                2915

aca tac tct cac cac gaa ctg acg cgg gtg gct tca gcc ctc aga aaa     9139
Thr Tyr Ser His His Glu Leu Thr Arg Val Ala Ser Ala Leu Arg Lys
         2920                2925                2930

ctt ggg gcg cca ccc ctc agg gtg tgg aag agt cgg gct cgc gca gtc     9187
Leu Gly Ala Pro Pro Leu Arg Val Trp Lys Ser Arg Ala Arg Ala Val
   2935                2940                2945

agg gcg tcc ctc atc tcc cgt gga ggg aaa gcg gcc gtt tgc ggc cga     9235
Arg Ala Ser Leu Ile Ser Arg Gly Gly Lys Ala Ala Val Cys Gly Arg
2950                2955                2960                2965
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tat ctc ttc aat tgg gcg gtg aag acc aag ctc aaa ctc act cca ttg      9283
Tyr Leu Phe Asn Trp Ala Val Lys Thr Lys Leu Lys Leu Thr Pro Leu
                2970             2975             2980

ccg gag gcg cgc cta ctg gac tta tcc agt tgg ttc acc gtc ggc gcc      9331
Pro Glu Ala Arg Leu Leu Asp Leu Ser Ser Trp Phe Thr Val Gly Ala
            2985             2990             2995

ggc ggg ggc gac att ttt cac agc gtg tcg cgc gcc cga ccc cgc tca      9379
Gly Gly Gly Asp Ile Phe His Ser Val Ser Arg Ala Arg Pro Arg Ser
        3000             3005             3010

tta ctc ttc ggc cta ctc cta ctt ttc gta ggg gta ggc ctc ttc cta      9427
Leu Leu Phe Gly Leu Leu Leu Leu Phe Val Gly Val Gly Leu Phe Leu
    3015             3020             3025

ctc ccc gct cgg tag agcggcacac actaggtaca ctccatagct aactgttcct      9482
Leu Pro Ala Arg
3030

tttttttttt tttttttttt tttttttttt tttttttttt ttcttttttt tttttttccc 9542

tctttcttcc cttctcatct tattctactt tctttcttgg tggctccatc ttagccctag 9602

tcacggctag ctgtgaaagg tccgtgagcc gcatgactgc agagagtgcc gtaactggtc 9662

tctctgcaga tcatgt                                                  9678


<210> 4
<211> 3033
<212> PRT
<213> Hepatitis C virus

<400> 4
Met Ser Thr Asn Pro Lys Pro Gln Arg Lys Thr Lys Arg Asn Thr Asn
  1               5                  10                  15
Arg Arg Pro Glu Asp Val Lys Phe Pro Gly Gly Gly Gln Ile Val Gly
            20                  25                  30
Gly Val Tyr Leu Leu Pro Arg Arg Gly Pro Arg Leu Gly Val Arg Thr
        35                  40                  45
Thr Arg Lys Thr Ser Glu Arg Ser Gln Pro Arg Gly Arg Arg Gln Pro
    50                  55                  60
Ile Pro Lys Asp Arg Arg Ser Thr Gly Lys Ala Trp Gly Lys Pro Gly
65                  70                  75                  80
Arg Pro Trp Pro Leu Tyr Gly Asn Glu Gly Leu Gly Trp Ala Gly Trp
                85                  90                  95

Leu Leu Ser Pro Arg Gly Ser Arg Pro Ser Trp Gly Pro Thr Asp Pro
                100                 105                 110
Arg His Arg Ser Arg Asn Val Gly Lys Val Ile Asp Thr Leu Thr Cys
        115                 120                 125
Gly Phe Ala Asp Leu Met Gly Tyr Ile Pro Val Val Gly Ala Pro Leu
    130                 135                 140
Ser Gly Ala Ala Arg Ala Val Ala His Gly Val Arg Val Leu Glu Asp
145                 150                 155                 160
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20

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Gly Val Asn Tyr Ala Thr Gly Asn Leu Pro Gly Phe Pro Phe Ser Ile
                165                 170                 175
Phe Leu Leu Ala Leu Leu Ser Cys Ile Thr Val Pro Val Ser Ala Ala
            180                 185                 190
Gln Val Lys Asn Thr Ser Ser Ser Tyr Met Val Thr Asn Asp Cys Ser
        195                 200                 205
Asn Asp Ser Ile Thr Trp Gln Leu Glu Ala Ala Val Leu His Val Pro
    210                 215                 220
Gly Cys Val Pro Cys Glu Arg Val Gly Asn Thr Ser Arg Cys Trp Val
225                 230                 235                 240
Pro Val Ser Pro Asn Met Ala Val Arg Gln Pro Gly Ala Leu Thr Gln
                245                 250                 255
Gly Leu Arg Thr His Ile Asp Met Val Val Met Ser Ala Thr Phe Cys
            260                 265                 270
Ser Ala Leu Tyr Val Gly Asp Leu Cys Gly Gly Val Met Leu Ala Ala
        275                 280                 285
Gln Val Phe Ile Val Ser Pro Gln Tyr His Trp Phe Val Gln Glu Cys
    290                 295                 300
Asn Cys Ser Ile Tyr Pro Gly Thr Ile Thr Gly His Arg Met Ala Trp
305                 310                 315                 320
Asp Met Met Met Asn Trp Ser Pro Thr Ala Thr Met Ile Leu Ala Tyr
                325                 330                 335
Val Met Arg Val Pro Glu Val Ile Ile Asp Ile Val Ser Gly Ala His
            340                 345                 350
Trp Gly Val Met Phe Gly Leu Ala Tyr Phe Ser Met Gln Gly Ala Trp
            355                 360                 365
Ala Lys Val Ile Val Ile Leu Leu Leu Ala Ala Gly Val Asp Ala Gly
        370                 375                 380
Thr Thr Thr Val Gly Gly Ala Val Ala Arg Ser Thr Asn Val Ile Ala
385                 390                 395                 400
Gly Val Phe Ser His Gly Pro Gln Gln Asn Ile Gln Leu Ile Asn Thr
            405                 410                 415
Asn Gly Ser Trp His Ile Asn Arg Thr Ala Leu Asn Cys Asn Asp Ser
            420                 425                 430
Leu Asn Thr Gly Phe Leu Ala Ala Leu Phe Tyr Thr Asn Arg Phe Asn
        435                 440                 445
Ser Ser Gly Cys Pro Gly Arg Leu Ser Ala Cys Arg Asn Ile Glu Ala
    450                 455                 460
Phe Arg Ile Gly Trp Gly Thr Leu Gln Tyr Glu Asp Asn Val Thr Asn
465                 470                 475                 480
Pro Glu Asp Met Arg Pro Tyr Cys Trp His Tyr Pro Pro Lys Pro Cys
            485                 490                 495
Gly Val Val Pro Ala Arg Ser Val Cys Gly Pro Val Tyr Cys Phe Thr
            500                 505                 510
Pro Ser Pro Val Val Val Gly Thr Thr Asp Arg Arg Gly Val Pro Thr
        515                 520                 525
Tyr Thr Trp Gly Glu Asn Glu Thr Asp Val Phe Leu Leu Asn Ser Thr
    530                 535                 540
Arg Pro Pro Gln Gly Ser Trp Phe Gly Cys Thr Trp Met Asn Ser Thr
545                 550                 555                 560
Gly Phe Thr Lys Thr Cys Gly Ala Pro Pro Cys Arg Thr Arg Ala Asp
            565                 570                 575
Phe Asn Ala Ser Thr Asp Leu Leu Cys Pro Thr Asp Cys Phe Arg Lys
            580                 585                 590
His Pro Asp Ala Thr Tyr Ile Lys Cys Gly Ser Gly Pro Trp Leu Thr
            595                 600                 605
Pro Lys Cys Leu Val His Tyr Pro Tyr Arg Leu Trp His Tyr Pro Cys
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          610                        615                        620
Thr Val Asn Phe Thr Ile Phe Lys Ile Arg Met Tyr Val Gly Gly Val
625                        630                        635                        640
Glu His Arg Leu Thr Ala Ala Cys Asn Phe Thr Arg Gly Asp Arg Cys
                    645                        650                        655
Asp Leu Glu Asp Arg Asp Arg Ser Gln Leu Ser Pro Leu Leu His Ser
                    660                        665                        670
Thr Thr Glu Trp Ala Ile Leu Pro Cys Thr Tyr Ser Asp Leu Pro Ala
                    675                        680                        685
Leu Ser Thr Gly Leu Leu His Leu His Gln Asn Ile Val Asp Val Gln
          690                        695                        700
Tyr Met Tyr Gly Leu Ser Pro Ala Ile Thr Lys Tyr Val Val Arg Trp
705                        710                        715                        720
Glu Trp Val Val Leu Leu Phe Leu Leu Leu Ala Asp Ala Arg Val Cys
                    725                        730                        735
Ala Cys Leu Trp Met Leu Ile Leu Leu Gly Gln Ala Glu Ala Ala Leu
                    740                        745                        750
Glu Lys Leu Val Val Leu His Ala Ala Ser Ala Ala Asn Cys His Gly
                    755                        760                        765
Leu Leu Tyr Phe Ala Ile Phe Phe Val Ala Ala Trp His Ile Arg Gly
          770                        775                        780
Arg Val Val Pro Leu Thr Thr Tyr Cys Leu Thr Gly Leu Trp Pro Phe
785                        790                        795                        800
Cys Leu Leu Leu Met Ala Leu Pro Arg Gln Ala Tyr Ala Tyr Asp Ala
                    805                        810                        815
Pro Val His Gly Gln Ile Gly Val Gly Leu Leu Ile Leu Ile Thr Leu
                    820                        825                        830
Phe Thr Leu Thr Pro Gly Tyr Lys Thr Leu Leu Gly Gln Cys Leu Trp
                    835                        840                        845
Trp Leu Cys Tyr Leu Leu Thr Leu Gly Glu Ala Met Ile Gln Glu Trp
          850                        855                        860
Val Pro Pro Met Gln Val Arg Gly Gly Arg Asp Gly Ile Ala Trp Ala
865                        870                        875                        880
Val Thr Ile Phe Cys Pro Gly Val Val Phe Asp Ile Thr Lys Trp Leu
                    885                        890                        895
Leu Ala Leu Leu Gly Pro Ala Tyr Leu Leu Arg Ala Ala Leu Thr His
                    900                        905                        910
Val Pro Tyr Phe Val Arg Ala His Ala Leu Ile Arg Val Cys Ala Leu
                    915                        920                        925
Val Lys Gln Leu Ala Gly Gly Arg Tyr Val Gln Val Ala Leu Leu Ala
          930                        935                        940
Leu Gly Arg Trp Thr Gly Thr Tyr Ile Tyr Asp His Leu Thr Pro Met
945                        950                        955                        960
Ser Asp Trp Ala Ala Ser Gly Leu Arg Asp Leu Ala Val Ala Val Glu
                    965                        970                        975
Pro Ile Ile Phe Ser Pro Met Glu Lys Lys Val Ile Val Trp Gly Ala
                    980                        985                        990
Glu Thr Ala Ala Cys Gly Asp Ile Leu His Gly Leu Pro Val Ser Ala
                    995                        1000                       1005
Arg Leu Gly Gln Glu Ile Leu Leu Gly Pro Ala Asp Gly Tyr Thr Ser
          1010                       1015                       1020
Lys Gly Trp Lys Leu Leu Ala Pro Ile Thr Ala Tyr Ala Gln Gln Thr
1025                       1030                       1035                       1040
Arg Gly Leu Leu Gly Ala Ile Val Val Ser Met Thr Gly Arg Asp Arg
                    1045                       1050                       1055
Thr Glu Gln Ala Gly Glu Val Gln Ile Leu Ser Thr Val Ser Gln Ser
                    1060                       1065                       1070
```

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Phe Leu Gly Thr Thr Ile Ser Gly Val Leu Trp Thr Val Tyr His Gly
        1075                1080                1085
Ala Gly Asn Lys Thr Leu Ala Gly Leu Arg Gly Pro Val Thr Gln Met
    1090                1095                1100
Tyr Ser Ser Ala Glu Gly Asp Leu Val Gly Trp Pro Ser Pro Pro Gly
1105                1110                1115                1120
Thr Lys Ser Leu Glu Pro Cys Lys Cys Gly Ala Val Asp Leu Tyr Leu
                1125                1130                1135
Val Thr Arg Asn Ala Asp Val Ile Pro Ala Arg Arg Arg Gly Asp Lys
            1140                1145                1150
Arg Gly Ala Leu Leu Ser Pro Arg Pro Ile Ser Thr Leu Lys Gly Ser
        1155                1160                1165
Ser Gly Gly Pro Val Leu Cys Pro Arg Gly His Val Val Gly Leu Phe
    1170                1175                1180
Arg Ala Ala Val Cys Ser Arg Gly Val Ala Lys Ser Ile Asp Phe Ile
1185                1190                1195                1200
Pro Val Glu Thr Leu Asp Val Val Thr Arg Ser Pro Thr Phe Ser Asp
                1205                1210                1215
Asn Ser Thr Pro Pro Ala Val Pro Gln Thr Tyr Gln Val Gly Tyr Leu
            1220                1225                1230
His Ala Pro Thr Gly Ser Gly Lys Ser Thr Lys Val Pro Val Ala Tyr
        1235                1240                1245
Ala Ala Gln Gly Tyr Lys Val Leu Val Leu Asn Pro Ser Val Ala Ala
    1250                1255                1260
Thr Leu Gly Phe Gly Ala Tyr Leu Ser Lys Ala His Gly Ile Asn Pro
1265                1270                1275                1280
Asn Ile Arg Thr Gly Val Arg Thr Val Met Thr Gly Glu Ala Ile Thr
            1285                1290                1295
Tyr Ser Thr Tyr Gly Lys Phe Leu Ala Asp Gly Gly Cys Ala Ser Gly
        1300                1305                1310
Ala Tyr Asp Ile Ile Ile Cys Asp Glu Cys His Ala Val Asp Ala Thr
        1315                1320                1325
Ser Ile Leu Gly Ile Gly Thr Val Leu Asp Gln Ala Glu Thr Ala Gly
    1330                1335                1340
Val Arg Leu Thr Val Leu Ala Thr Ala Thr Pro Pro Gly Ser Val Thr
1345                1350                1355                1360
Thr Pro His Pro Asp Ile Glu Glu Val Gly Leu Gly Arg Glu Gly Glu
            1365                1370                1375
Ile Pro Phe Tyr Gly Arg Ala Ile Pro Leu Ser Cys Ile Lys Gly Gly
        1380                1385                1390
Arg His Leu Ile Phe Cys His Ser Lys Lys Lys Cys Asp Glu Leu Ala
        1395                1400                1405
Ala Ala Leu Arg Gly Met Gly Leu Asn Ala Val Ala Tyr Tyr Arg Gly
    1410                1415                1420
Leu Asp Val Ser Ile Ile Pro Ala Gln Gly Asp Val Val Val Val Ala
1425                1430                1435                1440
Thr Asp Ala Leu Met Thr Gly Tyr Thr Gly Asp Phe Asp Ser Val Ile
            1445                1450                1455
Asp Cys Asn Val Ala Val Thr Gln Ala Val Asp Phe Ser Leu Asp Pro
            1460                1465                1470
Thr Phe Thr Ile Thr Thr Gln Thr Val Pro Gln Asp Ala Val Ser Arg
        1475                1480                1485
Ser Gln Arg Arg Gly Arg Thr Gly Arg Gly Arg Gln Gly Thr Tyr Arg
    1490                1495                1500
Tyr Val Ser Thr Gly Glu Arg Ala Ser Gly Met Phe Asp Ser Val Val
1505                1510                1515                1520
Leu Cys Glu Cys Tyr Asp Ala Gly Ala Ala Trp Tyr Asp Leu Thr Pro
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                1525                    1530                    1535
Ala Glu Thr Thr Val Arg Leu Arg Ala Tyr Phe Asn Thr Pro Gly Leu
           1540                    1545                    1550
Pro Val Cys Gln Asp His Leu Glu Phe Trp Glu Ala Val Phe Thr Gly
          1555                    1560                    1565
Leu Thr His Ile Asp Ala His Phe Leu Ser Gln Thr Lys Gln Ala Gly
       1570                    1575                    1580
Glu Asn Phe Ala Tyr Leu Val Ala Tyr Gln Ala Thr Val Cys Ala Arg
1585                    1590                    1595                    1600
Ala Lys Ala Pro Pro Pro Ser Trp Asp Ala Met Trp Lys Cys Leu Ala
                1605                    1610                    1615
Arg Leu Lys Pro Thr Leu Ala Gly Pro Thr Pro Leu Leu Tyr Arg Leu
          1620                    1625                    1630
Gly Pro Ile Thr Asn Glu Val Thr Leu Thr His Pro Gly Thr Lys Tyr
          1635                    1640                    1645
Ile Ala Thr Cys Met Gln Ala Asp Leu Glu Val Met Thr Ser Thr Trp
       1650                    1655                    1660
Val Leu Ala Gly Gly Val Leu Ala Ala Val Ala Ala Tyr Cys Leu Ala
1665                    1670                    1675                    1680
Thr Gly Cys Val Ser Ile Ile Gly Arg Leu His Val Asn Gln Arg Val
                1685                    1690                    1695
Val Val Ala Pro Asp Lys Glu Val Leu Tyr Glu Ala Phe Asp Glu Met
          1700                    1705                    1710
Glu Glu Cys Ala Ser Arg Ala Ala Leu Ile Glu Glu Gly Gln Arg Ile
          1715                    1720                    1725
Ala Glu Met Leu Lys Ser Lys Ile Gln Gly Leu Leu Gln Gln Ala Ser
       1730                    1735                    1740
Lys Gln Ala Gln Asp Ile Gln Pro Ala Met Gln Ala Ser Trp Pro Lys
1745                    1750                    1755                    1760
Val Glu Gln Phe Trp Ala Arg His Met Trp Asn Phe Ile Ser Gly Ile
             1765                    1770                    1775
Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn Pro Ala Val Ala
          1780                    1785                    1790
Ser Met Met Ala Phe Ser Ala Ala Leu Thr Ser Pro Leu Ser Thr Ser
          1795                    1800            ·        1805
Thr Thr Ile Leu Leu Asn Ile Met Gly Gly Trp Leu Ala Ser Gln Ile
       1810                    1815                    1820
Ala Pro Pro Ala Gly Ala Thr Gly Phe Val Val Ser Gly Leu Val Gly
1825                    1830                    1835                    1840
Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu
             1845                    1850                    1855
Ala Gly Tyr Gly Ala Gly Ile Ser Gly Ala Leu Val Ala Phe Lys Ile
          1860                    1865                    1870
Met Ser Gly Glu Lys Pro Ser Met Glu Asp Val Ile Asn Leu Leu Pro
          1875                    1880                    1885
Gly Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Ile Cys Ala Ala
       1890                    1895                    1900
Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val Gln Trp Met
1905                    1910                    1915                    1920
Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val Ala Pro Thr
             1925                    1930                    1935
His Tyr Val Thr Glu Ser Asp Ala Ser Gln Arg Val Thr Gln Leu Leu
          1940                    1945                    1950
Gly Ser Leu Thr Ile Thr Ser Leu Leu Arg Arg Leu His Asn Trp Ile
          1955                    1960                    1965
Thr Glu Asp Cys Pro Ile Pro Cys Ser Gly Ser Trp Leu Arg Asp Val
       1970                    1975                    1980
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Trp Asp Trp Val Cys Thr Ile Leu Thr Asp Phe Lys Asn Trp Leu Thr
1985   1990   1995   2000
Ser Lys Leu Phe Pro Lys Leu Pro Gly Leu Pro Phe Ile Ser Cys Gln
           2005   2010   2015
Lys Gly Tyr Lys Gly Val Trp Ala Gly Thr Gly Ile Met Thr Thr Arg
           2020   2025   2030
Cys Pro Cys Gly Ala Asn Ile Ser Gly Asn Val Arg Leu Gly Ser Met
           2035   2040   2045
Arg Ile Thr Gly Pro Lys Thr Cys Met Asn Thr Trp Gln Gly Thr Phe
      2050   2055   2060
Pro Ile Asn Cys Tyr Thr Glu Gly Gln Cys Ala Pro Lys Pro Pro Thr
2065   2070   2075   2080
Asn Tyr Lys Thr Ala Ile Trp Arg Val Ala Ala Ser Glu Tyr Ala Glu
           2085   2090   2095
Val Thr Gln His Gly Ser Tyr Ser Tyr Val Thr Gly Leu Thr Thr Asp
           2100   2105   2110
Asn Leu Lys Ile Pro Cys Gln Leu Pro Ser Pro Glu Phe Phe Ser Trp
      2115   2120   2125
Val Asp Gly Val Gln Ile His Arg Phe Ala Pro Thr Pro Lys Pro Phe
      2130   2135   2140

Phe Arg Asp Glu Val Ser Phe Cys Val Gly Leu Asn Ser Tyr Ala Val
2145   2150   2155   2160
Gly Ser Gln Leu Pro Cys Glu Pro Glu Pro Asp Ala Asp Val Leu Arg
           2165   2170   2175
Ser Met Leu Thr Asp Pro Pro His Ile Thr Ala Glu Thr Ala Ala Arg
           2180   2185   2190
Arg Leu Ala Arg Gly Ser Pro Pro Ser Glu Ala Ser Ser Ser Val Ser
      2195   2200   2205
Gln Leu Ser Ala Pro Ser Leu Arg Ala Thr Cys Thr Thr His Ser Asn
   2210   2215   2220
Thr Tyr Asp Val Asp Met Val Asp Ala Asn Leu Leu Met Glu Gly Gly
2225   2230   2235   2240
Val Ala Gln Thr Glu Pro Glu Ser Arg. Val Pro Val Leu Asp Phe Leu
           2245   2250   2255
Glu Pro Met Ala Glu Glu Glu Ser Asp Leu Glu Pro Ser Ile Pro Ser
           2260   2265   2270
Glu Cys Met Leu Pro Arg Ser Gly Phe Pro Arg Ala Leu Pro Ala Trp
      2275   2280   2285
Ala Arg Pro Asp Tyr Asn Pro Pro Leu Val Glu Ser Trp Arg Arg Pro
2290   2295   2300
Asp Tyr Gln Pro Pro Thr Val Ala Gly Cys Ala Leu Pro Pro Pro Lys
2305   2310   2315   2320
Lys Ala Pro Thr Pro Pro Pro Arg Arg Arg Arg Thr Val Gly Leu Ser
           2325   2330   2335
Glu Ser Thr Ile Ser Glu Ala Leu Gln Gln Leu Ala Ile Lys Thr Phe
           2340   2345   2350
Gly Gln Pro Pro Ser Ser Gly Asp Ala Gly Ser Ser Thr Gly Ala Gly
      2355   2360   2365
Ala Ala Glu Ser Gly Gly Pro Thr Ser Pro Gly Glu Pro Ala Pro Ser
   2370   2375   2380
Glu Thr Gly Ser Ala Ser Ser Met Pro Pro Leu Glu Gly Glu Pro Gly
2385   2390   2395   2400
Asp Pro Asp Leu Glu Ser Asp Gln Val Glu Leu Gln Pro Pro Pro Gln
           2405   2410   2415
Gly Gly Gly Val Ala Pro Gly Ser Gly Ser Gly Ser Trp Ser Thr Cys
           2420   2425   2430

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Ser Glu Glu Asp Asp Thr Thr Val Cys Cys Ser Met Ser Tyr Ser Trp
      2435                2440                2445
Thr Gly Ala Leu Ile Thr Pro Cys Ser Pro Glu Glu Glu Lys Leu Pro
   2450                2455                2460
Ile Asn Pro Leu Ser Asn Ser Leu Leu Arg Tyr His Asn Lys Val Tyr
2465                2470                2475                2480
Cys Thr Thr Ser Lys Ser Ala Ser Gln Arg Ala Lys Lys Val Thr Phe
             2485                2490                2495
Asp Arg Thr Gln Val Leu Asp Ala His Tyr Asp Ser Val Leu Lys Asp
          2500                2505                2510
Ile Lys Leu Ala Ala Ser Lys Val Ser Ala Arg Leu Leu Thr Leu Glu
      2515                2520                2525
Glu Ala Cys Gln Leu Thr Pro Pro His Ser Ala Arg Ser Lys Tyr Gly
   2530                2535                2540
Phe Gly Ala Lys Glu Val Arg Ser Leu Ser Gly Arg Ala Val Asn His
2545                2550                2555                2560
Ile Lys Ser Val Trp Lys Asp Leu Leu Glu Asp Pro Gln Thr Pro Ile
          2565                2570                2575
Pro Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Asp Pro Ala
          2580                2585                2590
Lys Gly Gly Lys Lys Pro Ala Arg Leu Ile Val Tyr Pro Asp Leu Gly
      2595                2600                2605
Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Ile Thr Gln Lys Leu
   2610                2615                2620
Pro Gln Ala Val Met Gly Ala Ser Tyr Gly Phe Gln Tyr Ser Pro Ala
2625                2630                2635                2640
Gln Arg Val Glu Tyr Leu Leu Lys Ala Trp Ala Glu Lys Lys Asp Pro
          2645                2650                2655
Met Gly Phe Ser Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu
          2660                2665                2670
Arg Asp Ile Arg Thr Glu Glu Ser Ile Tyr Gln Ala Cys Ser Leu Pro
      2675                2680                2685
Glu Glu Ala Arg Thr Ala Ile His Ser Leu Thr Glu Arg Leu Tyr Val
   2690                2695                2700
Gly Gly Pro Met Phe Asn Ser Lys Gly Gln Thr Cys Gly Tyr Arg Arg
2705                2710                2715                2720
Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Met Gly Asn Thr Ile Thr
          2725                2730                2735
Cys Tyr Val Lys Ala Leu Ala Ala Cys Lys Ala Ala Gly Ile Val Ala
          2740                2745                2750
Pro Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Ser Glu Ser
      2755                2760                2765
Gln Gly Thr Glu Glu Asp Glu Arg Asn Leu Arg Ala Phe Thr Glu Ala
   2770                2775                2780
Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Arg Pro Glu Tyr
2785                2790                2795                2800
Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala Leu
          2805                2810                2815
Gly Pro Arg Gly Arg Arg Arg Tyr Tyr Leu Thr Arg Asp Pro Thr Thr
          2820                2825                2830
Pro Leu Ala Arg Ala Ala Trp Glu Thr Val Arg His Ser Pro Ile Asn
      2835                2840                2845
Ser Trp Leu Gly Asn Ile Ile Gln Tyr Ala Pro Thr Ile Trp Val Arg
      2850                2855                2860
Met Val Leu Met Thr His Phe Phe Ser Ile Leu Met Val Gln Asp Thr
2865                2870                2875                2880
Leu Asp Gln Asn Leu Asn Phe Glu Met Tyr Gly Ser Val Tyr Ser Val
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                 2885              2890              2895
Asn Pro Leu Asp Leu Pro Ala Ile Ile Glu Arg Leu His Gly Leu Asp
             2900              2905              2910
Ala Phe Ser Met His Thr Tyr Ser His His Glu Leu Thr Arg Val Ala
         2915              2920              2925
Ser Ala Leu Arg Lys Leu Gly Ala Pro Pro Leu Arg Val Trp Lys Ser
     2930              2935              2940
Arg Ala Arg Ala Val Arg Ala Ser Leu Ile Ser Arg Gly Gly Lys Ala
 2945              2950              2955              2960
Ala Val Cys Gly Arg Tyr Leu Phe Asn Trp Ala Val Lys Thr Lys Leu
             2965              2970              2975
Lys Leu Thr Pro Leu Pro Glu Ala Arg Leu Leu Asp Leu Ser Ser Trp
             2980              2985              2990
Phe Thr Val Gly Ala Gly Gly Gly Asp Ile Phe His Ser Val Ser Arg
         2995              3000              3005
Ala Arg Pro Arg Ser Leu Leu Phe Gly Leu Leu Leu Leu Phe Val Gly
     3010              3015              3020
Val Gly Leu Phe Leu Leu Pro Ala Arg
 3025              3030


<210> 5
<211> 9674
<212> DNA
<213> Hepatitis C virus

<220>
<221> CDS
<222> (341)..(9442)

<400> 5
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cttcacgcag aaagcgtcta gccatggcgt tagtatgagt gtcgtacagc ctccaggccc  120

cccctcccg ggagagccat agtggtctgc ggaaccggtg agtacaccgg aattgccggg  180

aagactgggt cctttcttgg ataaacccac tctatgcccg gccatttggg cgtgcccccg  240

caagactgct agccgagtag cgttgggttg cgaaaggcct tgtggtactg cctgataggg  300

tgcttgcgag tgccccggga ggtctcgtag accgtgcacc atg agc aca aat ccc  355
                                            Met Ser Thr Asn Pro
                                             1               5

aaa cct caa aga aaa acc aaa aga aac act aac cgt cgc cca caa gac  403
Lys Pro Gln Arg Lys Thr Lys Arg Asn Thr Asn Arg Arg Pro Gln Asp
            10              15              20

gtt aag ttt ccg ggc ggc ggc cag atc gtt ggc gga gta tac ttg ttg  451
Val Lys Phe Pro Gly Gly Gly Gln Ile Val Gly Gly Val Tyr Leu Leu
            25              30              35

ccg cgc agg ggc ccc agg ttg ggt gtg cgc gcg aca agg aag gct tcg  499
Pro Arg Arg Gly Pro Arg Leu Gly Val Arg Ala Thr Arg Lys Ala Ser
        40              45              50
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27

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gag cgg tcc cag cca cgt ggg agg cgc cag ccc atc ccc aaa cat cgg    547
Glu Arg Ser Gln Pro Arg Gly Arg Arg Gln Pro Ile Pro Lys His Arg
        55                  60                  65

cgc tcc act ggc aag tcc tgg ggg aag cca gga tac ccc tgg ccc ctg    595
Arg Ser Thr Gly Lys Ser Trp Gly Lys Pro Gly Tyr Pro Trp Pro Leu
70                  75                  80                  85

tat ggg aat gag ggg ctc ggt tgg gca gga tgg ctc ctg tcc cct cga    643
Tyr Gly Asn Glu Gly Leu Gly Trp Ala Gly Trp Leu Leu Ser Pro Arg
                    90                  95                  100

ggt tcc cgt ccc tca tgg ggc ccc aat gac ccc cgg cat agg tcg cgc    691
Gly Ser Arg Pro Ser Trp Gly Pro Asn Asp Pro Arg His Arg Ser Arg
                105                 110                 115

aat gtg ggt aag gtc atc gat acc cta acg tgc ggc ttt gcc gac ctc    739
Asn Val Gly Lys Val Ile Asp Thr Leu Thr Cys Gly Phe Ala Asp Leu
            120                 125                 130

ttg ggg tac gtc ccc gtc gta ggc gcc ccg ctt agt ggc gtt gcc agt    787
Leu Gly Tyr Val Pro Val Val Gly Ala Pro Leu Ser Gly Val Ala Ser
        135                 140                 145

gct ctc gcg cac ggc gtg aga gtc ctg gag gac ggg gtt aat ttt gca    835
Ala Leu Ala His Gly Val Arg Val Leu Glu Asp Gly Val Asn Phe Ala
150                 155                 160                 165

aca ggg aac tta cct ggt tgc tcc ttt tct atc ttc ttg ctg gcc cta    883
Thr Gly Asn Leu Pro Gly Cys Ser Phe Ser Ile Phe Leu Leu Ala Leu
                170                 175                 180

ctg tcc tgc atc act act ccg gtc tct gct gtc caa gtg aag aac acc    931
Leu Ser Cys Ile Thr Thr Pro Val Ser Ala Val Gln Val Lys Asn Thr
                185                 190                 195

agc aac gcc tat atg gcg act aac gac tgt tcc aat gac agc atc act    979
Ser Asn Ala Tyr Met Ala Thr Asn Asp Cys Ser Asn Asp Ser Ile Thr
            200                 205                 210

tgg cag ctt gag gcc gca gtc ctc cat gtc ccc ggg tgc gtc ccg tgc   1027
Trp Gln Leu Glu Ala Ala Val Leu His Val Pro Gly Cys Val Pro Cys
        215                 220                 225

gag aaa atg ggg aac aca tca cgg tgc tgg ata cca gtc tca cca aac   1075
Glu Lys Met Gly Asn Thr Ser Arg Cys Trp Ile Pro Val Ser Pro Asn
230                 235                 240                 245

gtg gct gtg cgg cag cct ggc gcc ctc acg cgg ggc ttg cgg acg cac   1123
Val Ala Val Arg Gln Pro Gly Ala Leu Thr Arg Gly Leu Arg Thr His
                250                 255                 260

atc gac atg gtc gtg ttg tcc gcc acg ctc tgc tcc gct ctc tac gtg   1171
Ile Asp Met Val Val Leu Ser Ala Thr Leu Cys Ser Ala Leu Tyr Val
                265                 270                 275

ggg gac ctc tgt ggc ggg gtg atg ctc gcg tcc cag atg ttc att gtc   1219
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Gly Asp Leu Cys Gly Gly Val Met Leu Ala Ser Gln Met Phe Ile Val
    280                 285                 290

tcg ccg cag cac cac tgg ttc gtg cag gaa tgc aat tgc tcc atc tac   1267
Ser Pro Gln His His Trp Phe Val Gln Glu Cys Asn Cys Ser Ile Tyr
    295                 300                 305

cct ggc gcc atc act ggg cac cgt atg gca tgg gac atg atg atg aac   1315
Pro Gly Ala Ile Thr Gly His Arg Met Ala Trp Asp Met Met Met Asn
310                 315                 320                 325

tgg tcg ccc acg acc acc atg atc ctg gcg tac gtg atg cgc gtt ccc   1363
Trp Ser Pro Thr Thr Thr Met Ile Leu Ala Tyr Val Met Arg Val Pro
                330                 335                 340

gag gtc atc ata gac atc att agc gga gct cac tgg ggc gtc atg ttt   1411
Glu Val Ile Ile Asp Ile Ile Ser Gly Ala His Trp Gly Val Met Phe
                345                 350                 355

ggc ctg gcc tac ttc tct atg cag gga gcg tgg gcg aag gtc gtt gtc   1459
Gly Leu Ala Tyr Phe Ser Met Gln Gly Ala Trp Ala Lys Val Val Val
    360                 365                 370

atc ctc ctg ctg gcc tct ggg gtg gac gcg tac acc acc acg act ggg   1507
Ile Leu Leu Leu Ala Ser Gly Val Asp Ala Tyr Thr Thr Thr Thr Gly
    375                 380                 385

agc gct gct ggg cgc act acc agt agc ctg gcc agc gcc ttc tcc cct   1555
Ser Ala Ala Gly Arg Thr Thr Ser Ser Leu Ala Ser Ala Phe Ser Pro
390                 395                 400                 405

ggc gct cgg cag aac att cag ctc att aat acc aat ggt agc tgg cac   1603
Gly Ala Arg Gln Asn Ile Gln Leu Ile Asn Thr Asn Gly Ser Trp His
                410                 415                 420

atc aac cgc acc gcc ctg aat tgc aac gat tcc ttg cac acc ggc ttc   1651
Ile Asn Arg Thr Ala Leu Asn Cys Asn Asp Ser Leu His Thr Gly Phe
                425                 430                 435

ttc acg gcc ctg ttc tac atc cat aag ttc aac tcg tcg gga tgt ccc   1699
Phe Thr Ala Leu Phe Tyr Ile His Lys Phe Asn Ser Ser Gly Cys Pro
                440                 445                 450

gag cgc ctg tcc gcc tgt cgc aac atc gag gac ttc cgg ata gga tgg   1747
Glu Arg Leu Ser Ala Cys Arg Asn Ile Glu Asp Phe Arg Ile Gly Trp
    455                 460                 465

ggc gcc ctg caa tac gac gac aat gtc acc aat cca gaa gat atg agg   1795
Gly Ala Leu Gln Tyr Asp Asp Asn Val Thr Asn Pro Glu Asp Met Arg
470                 475                 480                 485

cca tat tgc tgg cac tac cca cca aaa cag tgt ggc gta gtc ccc gca   1843
Pro Tyr Cys Trp His Tyr Pro Pro Lys Gln Cys Gly Val Val Pro Ala
                490                 495                 500

ggg acc gtg tgc ggc cca gtg tac tgt ttc acc cct agc ccg gtg gta   1891
Gly Thr Val Cys Gly Pro Val Tyr Cys Phe Thr Pro Ser Pro Val Val
```

29

gtg ggc acg acc gat aga ctt gga gtg cct act tac acg tgg gga gag   1939
Val Gly Thr Thr Asp Arg Leu Gly Val Pro Thr Tyr Thr Trp Gly Glu
        520   525   530

aat gag aca gat gtc ttc cta ttg aac agc acc cga cca ccg tcg ggg   1987
Asn Glu Thr Asp Val Phe Leu Leu Asn Ser Thr Arg Pro Pro Ser Gly
        535   540   545

tca tgg ttt ggc tgc acg tgg atg aac tcc act ggc ttc acc aag acc   2035
Ser Trp Phe Gly Cys Thr Trp Met Asn Ser Thr Gly Phe Thr Lys Thr
550   555   560   565

tgc ggc gca cca ccc tgc cgc act aga gct gac ttc aat acc agc aca   2083
Cys Gly Ala Pro Pro Cys Arg Thr Arg Ala Asp Phe Asn Thr Ser Thr
                570   575   580

gat ctg ttg tgc ccc acg gac tgt ttt aga aaa cat cct gaa gcc act   2131
Asp Leu Leu Cys Pro Thr Asp Cys Phe Arg Lys His Pro Glu Ala Thr
                585   590   595

tac atc aaa tgt ggt tcc ggg cct tgg ctc acg cca aag tgt ctg gtt   2179
Tyr Ile Lys Cys Gly Ser Gly Pro Trp Leu Thr Pro Lys Cys Leu Val
            600   605   610

gac tac ccc tac agg ctc tgg cat tac cct tgc aca gtc aat tac tcc   2227
Asp Tyr Pro Tyr Arg Leu Trp His Tyr Pro Cys Thr Val Asn Tyr Ser
        615   620   625

acc ttc aag atc agg atg tat gtg ggg gga gtt gag cac agg ctc atg   2275
Thr Phe Lys Ile Arg Met Tyr Val Gly Gly Val Glu His Arg Leu Met
630   635   640   645

gcc gcg tgc aat ttc act cgt ggg gat cgc tgc aac ttg gag gat agg   2323
Ala Ala Cys Asn Phe Thr Arg Gly Asp Arg Cys Asn Leu Glu Asp Arg
                650   655   660

gac aga agt caa cag act cct ctg ttg cac tcc acc acg gaa tgg gcc   2371
Asp Arg Ser Gln Gln Thr Pro Leu Leu His Ser Thr Thr Glu Trp Ala
                665   670   675

att ttg ccc tgc tct ttc tca gac ttg ccc gct ttg tcg act ggt ctt   2419
Ile Leu Pro Cys Ser Phe Ser Asp Leu Pro Ala Leu Ser Thr Gly Leu
                680   685   690

ctc cac ctc cac caa aat atc gtg gac gta caa tat atg tat ggc ctg   2467
Leu His Leu His Gln Asn Ile Val Asp Val Gln Tyr Met Tyr Gly Leu
        695   700   705

tca cct gcc ctc aca caa tat atc gtt cga tgg gag tgg gta gta ctc   2515
Ser Pro Ala Leu Thr Gln Tyr Ile Val Arg Trp Glu Trp Val Val Leu
710   715   720   725

tta ttc ctg ctc cta gcg gac gcc agg gtc tgc gcc tgc ttg tgg atg   2563
Leu Phe Leu Leu Leu Ala Asp Ala Arg Val Cys Ala Cys Leu Trp Met
                730   735   740

30

```
ctc atc ttg ctg ggc caa gcc gaa gca gca ctg gag aag ctg gtc gtc      2611
Leu Ile Leu Leu Gly Gln Ala Glu Ala Ala Leu Glu Lys Leu Val Val
            745                 750                 755

ttg cac gct gcg agc gca gct agc tgc aat ggc ttc ctg tat ttt gtc      2659
Leu His Ala Ala Ser Ala Ala Ser Cys Asn Gly Phe Leu Tyr Phe Val
            760                 765                 770

atc ttt ctc gtg gct gct tgg cac atc aag ggt agg gtg gtc ccc ttg      2707
Ile Phe Leu Val Ala Ala Trp His Ile Lys Gly Arg Val Val Pro Leu
            775                 780                 785

gct gct tat tcc ctt act ggc ctg tgg ccg ttc tgc cta ctg ctc cta      2755
Ala Ala Tyr Ser Leu Thr Gly Leu Trp Pro Phe Cys Leu Leu Leu Leu
790                 795                 800                 805

gca ctg ccc cag cag gct tac gcc tat gat gca tct gtg cac gga cag      2803
Ala Leu Pro Gln Gln Ala Tyr Ala Tyr Asp Ala Ser Val His Gly Gln
            810                 815                 820

gtg ggc gcg gct ttg cta gta ctg att acc ctc ttt aca ctc acc ccg      2851
Val Gly Ala Ala Leu Leu Val Leu Ile Thr Leu Phe Thr Leu Thr Pro
            825                 830                 835

ggg tat aag acc ctt ctc agc cag tcc ctg tgg tgg ttg tgc tat ctc      2899
Gly Tyr Lys Thr Leu Leu Ser Gln Ser Leu Trp Trp Leu Cys Tyr Leu
            840                 845                 850

ctg acc ctg gcg gaa acc atg gtc cag gag tgg gca cca tcc atg cag      2947
Leu Thr Leu Ala Glu Thr Met Val Gln Glu Trp Ala Pro Ser Met Gln
            855                 860                 865

gcg cgc ggc ggc cgt gat ggc atc ata tgg gcc gcc acc ata ttt tgc      2995
Ala Arg Gly Gly Arg Asp Gly Ile Ile Trp Ala Ala Thr Ile Phe Cys
870                 875                 880                 885

ccg ggc gta gtg ttt gac ata acc aag tgg ctc tta gcg gtg ctt ggg      3043
Pro Gly Val Val Phe Asp Ile Thr Lys Trp Leu Leu Ala Val Leu Gly
            890                 895                 900

cct ggt tac ctc cta aga ggt gct ttg acg cgc gtg cca tat ttc gtc      3091
Pro Gly Tyr Leu Leu Arg Gly Ala Leu Thr Arg Val Pro Tyr Phe Val
            905                 910                 915

aga gcc cac gct ctg ctg aga atg tgc act atg gtg agg cac ctc gcg      3139
Arg Ala His Ala Leu Leu Arg Met Cys Thr Met Val Arg His Leu Ala
            920                 925                 930

ggg ggt agg tac gtc cag atg gcg cta tta gcc ctt ggc agg tgg act      3187
Gly Gly Arg Tyr Val Gln Met Ala Leu Leu Ala Leu Gly Arg Trp Thr
            935                 940                 945

ggc act tac atc tat gac cac ctc acc cct atg tcg gat tgg gct gct      3235
Gly Thr Tyr Ile Tyr Asp His Leu Thr Pro Met Ser Asp Trp Ala Ala
950                 955                 960                 965
```

31

```
agc ggc ctg cgg gac ttg gcg gtc gct gtg gag cct atc atc ttc agt    3283
Ser Gly Leu Arg Asp Leu Ala Val Ala Val Glu Pro Ile Ile Phe Ser
            970                 975                 980

ccg atg gag aag aaa gtc atc gtt tgg gga gcg gag acg gct gcg tgc    3331
Pro Met Glu Lys Lys Val Ile Val Trp Gly Ala Glu Thr Ala Ala Cys
            985                 990                 995

ggg gac atc ttg cac gga ctt ccc gtg tcc gcc cga ctc ggt cgg gag    3379
Gly Asp Ile Leu His Gly Leu Pro Val Ser Ala Arg Leu Gly Arg Glu
        1000                1005                1010

atc ctc ctt ggc cca gct gat ggc tac acc tcc aag ggg tgg aag ctt    3427
Ile Leu Leu Gly Pro Ala Asp Gly Tyr Thr Ser Lys Gly Trp Lys Leu
    1015                1020                1025

ctc gcc ccc atc acc gct tac gcc cag cag aca cga ggt ctc ttg ggc    3475
Leu Ala Pro Ile Thr Ala Tyr Ala Gln Gln Thr Arg Gly Leu Leu Gly
1030                1035                1040                1045

tct ata gtg gtg agc atg acg ggg cgt gac aag aca gaa cag gcc ggg    3523
Ser Ile Val Val Ser Met Thr Gly Arg Asp Lys Thr Glu Gln Ala Gly
                1050                1055                1060

gag gtc caa gtc ctg tcc aca gtc act cag tcc ttc ctc gga aca tcc    3571
Glu Val Gln Val Leu Ser Thr Val Thr Gln Ser Phe Leu Gly Thr Ser
            1065                1070                1075

att tcg ggg gtc tta tgg act gtt tac cac gga gct ggc aac aag aca    3619
Ile Ser Gly Val Leu Trp Thr Val Tyr His Gly Ala Gly Asn Lys Thr
            1080                1085                1090

cta gcc ggc tcg cgg ggc ccg gtc acg cag atg tac tcg agc gcc gag    3667
Leu Ala Gly Ser Arg Gly Pro Val Thr Gln Met Tyr Ser Ser Ala Glu
    1095                1100                1105

ggg gac ttg gtc ggg tgg ccc agc cct cct ggg acc aaa tct ttg gag    3715
Gly Asp Leu Val Gly Trp Pro Ser Pro Pro Gly Thr Lys Ser Leu Glu
1110                1115                1120                1125

ccg tgt acg tgt gga gcg gtc gac ctg tat ttg gtc acg cgg aac gct    3763
Pro Cys Thr Cys Gly Ala Val Asp Leu Tyr Leu Val Thr Arg Asn Ala
                1130                1135                1140

gat gtc atc ccg gct cga aga cgc ggg gac aag cgg gga gcg ctg ctc    3811
Asp Val Ile Pro Ala Arg Arg Arg Gly Asp Lys Arg Gly Ala Leu Leu
            1145                1150                1155

tcc ccg aga ccc ctt tcg acc ttg aag ggg tcc tcg ggg gga cct gtg    3859
Ser Pro Arg Pro Leu Ser Thr Leu Lys Gly Ser Ser Gly Gly Pro Val
            1160                1165                1170

ctt tgc cct agg ggc cac gct gtc gga atc ttc cgg gca gct gtg tgc    3907
Leu Cys Pro Arg Gly His Ala Val Gly Ile Phe Arg Ala Ala Val Cys
    1175                1180                1185

tct cgg ggt gtg gct aag tcc ata gat ttc atc ccc gtt gag acg ctc    3955
```

32

```
Ser Arg Gly Val Ala Lys Ser Ile Asp Phe Ile Pro Val Glu Thr Leu
1190            1195            1200            1205


gac atc gtc acg cgg tct ccc acc ttt agt gac aac agc aca cca cca    4003
Asp Ile Val Thr Arg Ser Pro Thr Phe Ser Asp Asn Ser Thr Pro Pro
            1210            1215            1220


gct gtg ccc cag acc tat cag gtg ggg tac ttg cac gcc ccc act ggc    4051
Ala Val Pro Gln Thr Tyr Gln Val Gly Tyr Leu His Ala Pro Thr Gly
        1225            1230            1235


agt gga aaa agc acc aag gtc ccc gtc gcg tac gcc gcc cag ggg tat    4099
Ser Gly Lys Ser Thr Lys Val Pro Val Ala Tyr Ala Ala Gln Gly Tyr
        1240            1245            1250


aaa gtg ctg gtg ctc aat ccc tcg gtg gct gcc acc ctg gga ttt ggg    4147
Lys Val Leu Val Leu Asn Pro Ser Val Ala Ala Thr Leu Gly Phe Gly
    1255            1260            1265


gcg tac ttg tcc aag gca cat ggc atc aac ccc aac att agg act gga    4195
Ala Tyr Leu Ser Lys Ala His Gly Ile Asn Pro Asn Ile Arg Thr Gly
1270            1275            1280            1285


gtc aga act gtg acg acc ggg gag ccc att aca tac tcc acg tat ggt    4243
Val Arg Thr Val Thr Thr Gly Glu Pro Ile Thr Tyr Ser Thr Tyr Gly
            1290            1295            1300


aaa ttc ctc gcc gat ggg ggc tgc gca ggc ggc gcc tat gac atc atc    4291
Lys Phe Leu Ala Asp Gly Gly Cys Ala Gly Gly Ala Tyr Asp Ile Ile
            1305            1310            1315


ata tgc gat gaa tgc cac tct gtg gat gct acc act att ctc ggc atc    4339
Ile Cys Asp Glu Cys His Ser Val Asp Ala Thr Thr Ile Leu Gly Ile
        1320            1325            1330


ggg aca gtc ctt gac caa gca gag aca gcc ggg gtc agg cta act gta    4387
Gly Thr Val Leu Asp Gln Ala Glu Thr Ala Gly Val Arg Leu Thr Val
    1335            1340            1345


ctg gcc acg gcc acg ccc ccc ggg tcg gtg aca acc ccc cat ccc aat    4435
Leu Ala Thr Ala Thr Pro Pro Gly Ser Val Thr Thr Pro His Pro Asn
1350            1355            1360            1365


ata gag gag gta gcc ctc gga cag gag ggt gag atc ccc ttc tat ggg    4483
Ile Glu Glu Val Ala Leu Gly Gln Glu Gly Glu Ile Pro Phe Tyr Gly
            1370            1375            1380


agg gcg ttt ccc ctg tct tac atc aag gga ggg agg cac ttg att ttc    4531
Arg Ala Phe Pro Leu Ser Tyr Ile Lys Gly Gly Arg His Leu Ile Phe
        1385            1390            1395


tgc cac tca aag aaa aag tgt gac gag ctc gca acg gcc ctt cgg ggc    4579
Cys His Ser Lys Lys Lys Cys Asp Glu Leu Ala Thr Ala Leu Arg Gly
        1400            1405            1410


atg ggc ttg aac gct gtg gca tat tac aga ggg ttg gac gtc tcc ata    4627
```

33

```
          Met Gly Leu Asn Ala Val Ala Tyr Tyr Arg Gly Leu Asp Val Ser Ile
             1415                1420                1425


ata cca act caa gga gat gtg gtg gtc gtt gcc acc gac gcc ctc atg      4675
Ile Pro Thr Gln Gly Asp Val Val Val Ala Thr Asp Ala Leu Met
1430                1435                1440                1445


acg ggg tat act gga gac ttt gac tcc gtg atc gac tgc aac gta gcg      4723
Thr Gly Tyr Thr Gly Asp Phe Asp Ser Val Ile Asp Cys Asn Val Ala
                1450                1455                1460


gtc acc cag gcc gta gac ttc agc ctg gac ccc acc ttc act ata acc      4771
Val Thr Gln Ala Val Asp Phe Ser Leu Asp Pro Thr Phe Thr Ile Thr
                1465                1470                1475


aca cag act gtc ccg caa gac gct gtc tca cgt agt cag cgc cga ggg      4819
Thr Gln Thr Val Pro Gln Asp Ala Val Ser Arg Ser Gln Arg Arg Gly
             1480                1485                1490


cgc acg ggt aga gga aga ctg ggc att tat agg tat gtt tcc act ggt      4867
Arg Thr Gly Arg Gly Arg Leu Gly Ile Tyr Arg Tyr Val Ser Thr Gly
   1495                1500                1505


gag cga gcc tca gga atg ttt gac agt gta gta ctc tgt gag tgc tac      4915
Glu Arg Ala Ser Gly Met Phe Asp Ser Val Val Leu Cys Glu Cys Tyr
1510                1515                1520                1525


gac gca gga gct gct tgg tat gag ctc tca cca gtg gag acg acc gtc      4963
Asp Ala Gly Ala Ala Trp Tyr Glu Leu Ser Pro Val Glu Thr Thr Val
                1530                1535                1540


agg ctc agg gcg tat ttc aac acg cct ggc ttg cct gtg tgc cag gac      5011
Arg Leu Arg Ala Tyr Phe Asn Thr Pro Gly Leu Pro Val Cys Gln Asp
                1545                1550                1555


cac ctt gag ttt tgg gag gca gtt ttc acc ggc ctc aca cac ata gac      5059
His Leu Glu Phe Trp Glu Ala Val Phe Thr Gly Leu Thr His Ile Asp
             1560                1565                1570


gct cat ttc ctt tcc cag aca aag cag tcg ggg gaa aat ttc gca tac      5107
Ala His Phe Leu Ser Gln Thr Lys Gln Ser Gly Glu Asn Phe Ala Tyr
   1575                1580                1585


tta gta gcc tat cag gcc aca gtg tgc gcc agg gcc aaa gcg ccc ccc      5155
Leu Val Ala Tyr Gln Ala Thr Val Cys Ala Arg Ala Lys Ala Pro Pro
1590                1595                1600                1605


ccg tcc tgg gac gtc atg tgg aag tgc ttg act cga ctc aag ccc acg      5203
Pro Ser Trp Asp Val Met Trp Lys Cys Leu Thr Arg Leu Lys Pro Thr
                1610                1615                1620


ctt gtg ggc cct aca cct ctc ctg tac cgt ttg ggc tct gtt acc aac      5251
Leu Val Gly Pro Thr Pro Leu Leu Tyr Arg Leu Gly Ser Val Thr Asn
             1625                1630        .          1635


gag gtc acc ctt aca cac ccc gtg aca aaa tac atc gcc aca tgc atg      5299
```

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```
Glu Val Thr Leu Thr His Pro Val Thr Lys Tyr Ile Ala Thr Cys Met
     1640                    1645                   1650

caa gct gac ctc gag gtc atg acc agc acg tgg gtc ctg gct ggg gga   5347
Gln Ala Asp Leu Glu Val Met Thr Ser Thr Trp Val Leu Ala Gly Gly
   1655                    1660                   1665

gtc tta gca gcc gtc gcc gcg tat tgc tta gcg acc ggg tgt gtt tcc   5395
Val Leu Ala Ala Val Ala Ala Tyr Cys Leu Ala Thr Gly Cys Val Ser
1670                    1675                   1680                   1685

atc att ggc cgt tta cac atc aac cag cga gct gtc gtc gct ccg gac   5443
Ile Ile Gly Arg Leu His Ile Asn Gln Arg Ala Val Val Ala Pro Asp
                  1690                   1695                   1700

aag gag gtc ctc tat gag gct ttt gat gag atg gag gaa tgt gcc tcc   5491
Lys Glu Val Leu Tyr Glu Ala Phe Asp Glu Met Glu Glu Cys Ala Ser
             1705                    1710                   1715

aga gcg gct ctc ctt gaa gag ggg cag cgg ata gcc gag atg ctg aag   5539
Arg Ala Ala Leu Leu Glu Glu Gly Gln Arg Ile Ala Glu Met Leu Lys
        1720                    1725                   1730

tcc aag atc caa ggc tta ttg cag caa gcc tct aaa cag gcc cag gac   5587
Ser Lys Ile Gln Gly Leu Leu Gln Gln Ala Ser Lys Gln Ala Gln Asp
   1735                    1740                   1745

ata caa ccc gct gtg caa gct tcg tgg ccc aag atg gag caa ttc tgg   5635
Ile Gln Pro Ala Val Gln Ala Ser Trp Pro Lys Met Glu Gln Phe Trp
1750                    1755                   1760                   1765

gcc aaa cat atg tgg aac ttc ata agc ggc att cag tac ctc gca gga   5683
Ala Lys His Met Trp Asn Phe Ile Ser Gly Ile Gln Tyr Leu Ala Gly
                  1770                   1775                   1780

ctg tca aca ctg cca ggg aac cct gct gtg gct tcc atg atg gca ttc   5731
Leu Ser Thr Leu Pro Gly Asn Pro Ala Val Ala Ser Met Met Ala Phe
                  1785                   1790                   1795

agc gcc gcc ctc acc agt ccg ttg tca act agc acc acc atc ctt ctt   5779
Ser Ala Ala Leu Thr Ser Pro Leu Ser Thr Ser Thr Thr Ile Leu Leu
        1800                    1805                   1810

aac att ctg ggg ggc tgg ctg gcg tcc caa att gcg cca ccc gcg ggg   5827
Asn Ile Leu Gly Gly Trp Leu Ala Ser Gln Ile Ala Pro Pro Ala Gly
   1815                    1820                   1825

gcc act ggc ttt gtt gtc agt ggc ctg gtg gga gct gct gtt ggc agc   5875
Ala Thr Gly Phe Val Val Ser Gly Leu Val Gly Ala Ala Val Gly Ser
1830                    1835                   1840                   1845

ata ggc ttg ggt aaa gtg ctg gtg gac atc ctg gca ggg tat ggt gcg   5923
Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu Ala Gly Tyr Gly Ala
                  1850                   1855                   1860

ggc att tcg ggg gcc ctc gtc gcg ttt aag atc atg tct ggc gag aag   5971
Gly Ile Ser Gly Ala Leu Val Ala Phe Lys Ile Met Ser Gly Glu Lys
```

35

```
ccc tcc atg gag gat gtc atc aac ttg ctg cct ggg att ctg tct cca    6019
Pro Ser Met Glu Asp Val Ile Asn Leu Leu Pro Gly Ile Leu Ser Pro
    1880                    1885                1890
```

```
ggt gct ctg gtg gtg gga gtc atc tgc gcg gcc att ctg cgc cgc cat    6067
Gly Ala Leu Val Val Gly Val Ile Cys Ala Ala Ile Leu Arg Arg His
    1895                1900                1905
```

```
gtg gga ccg ggg gaa ggc gcg gtc caa tgg atg aac agg ctt atc gcc    6115
Val Gly Pro Gly Glu Gly Ala Val Gln Trp Met Asn Arg Leu Ile Ala
1910                1915                1920                1925
```

```
ttc gct tcc aga gga aac cac gtc gcc cct act cac tac gtg acg gag    6163
Phe Ala Ser Arg Gly Asn His Val Ala Pro Thr His Tyr Val Thr Glu
            1930                1935                1940
```

```
tcg gat gcg tcg cag cgt gtc acc caa ctg ctt ggc tct ctc act ata    6211
Ser Asp Ala Ser Gln Arg Val Thr Gln Leu Leu Gly Ser Leu Thr Ile
            1945                1950                1955
```

```
act agt cta ctc agg aga ctt cac aac tgg atc act gag gat tgc ccc    6259
Thr Ser Leu Leu Arg Arg Leu His Asn Trp Ile Thr Glu Asp Cys Pro
        1960                1965                1970
```

```
atc cca tgc gcc ggc tcg tgg ctc cgc gat gtg tgg gac tgg gtc tgt    6307
Ile Pro Cys Ala Gly Ser Trp Leu Arg Asp Val Trp Asp Trp Val Cys
    1975                1980                1985
```

```
acc atc cta aca gac ttt aag aac tgg ctg acc tcc aag ctg ttc cca    6355
Thr Ile Leu Thr Asp Phe Lys Asn Trp Leu Thr Ser Lys Leu Phe Pro
1990                1995                2000                2005
```

```
aag atg cct ggc ctc ccc ttt atc tct tgc caa aag ggg tac aag ggc    6403
Lys Met Pro Gly Leu Pro Phe Ile Ser Cys Gln Lys Gly Tyr Lys Gly
            2010                2015                2020
```

```
gtg tgg gcc ggc act ggc atc atg acc aca cga tgc ccc tgc ggc gcc    6451
Val Trp Ala Gly Thr Gly Ile Met Thr Thr Arg Cys Pro Cys Gly Ala
            2025                2030                2035
```

```
aac atc tct ggc aac gtc cgc ttg ggc tct atg aga atc aca gga ccc    6499
Asn Ile Ser Gly Asn Val Arg Leu Gly Ser Met Arg Ile Thr Gly Pro
        2040                2045                2050
```

```
aaa acc tgc atg aac acc tgg cag ggg acc ttt cct atc aat tgt tat    6547
Lys Thr Cys Met Asn Thr Trp Gln Gly Thr Phe Pro Ile Asn Cys Tyr
    2055                2060                2065
```

```
aca gaa ggc cag tgc ttg ccg aaa ccc gcg tta aac ttc aag acc gcc    6595
Thr Glu Gly Gln Cys Leu Pro Lys Pro Ala Leu Asn Phe Lys Thr Ala
2070                2075                2080                2085
```

```
atc tgg aga gtg gcg gcc tca gag tac gcg gaa gtg acg cag cac gga    6643
Ile Trp Arg Val Ala Ala Ser Glu Tyr Ala Glu Val Thr Gln His Gly
```

```
tca tat gcc tat ata aca ggg ctg acc act gac aac tta aaa gtc cct     6691
Ser Tyr Ala Tyr Ile Thr Gly Leu Thr Thr Asp Asn Leu Lys Val Pro
        2105              2110              2115
```

```
tgc caa ctc ccc tct cca gag ttt ttc tct tgg gtg gac gga gta caa     6739
Cys Gln Leu Pro Ser Pro Glu Phe Phe Ser Trp Val Asp Gly Val Gln
        2120              2125              2130
```

```
atc cat agg tcc gcc ccc aca cca aag ccg ttt ttc cgg gat gag gtc     6787
Ile His Arg Ser Ala Pro Thr Pro Lys Pro Phe Phe Arg Asp Glu Val
    2135              2140              2145
```

```
tcg ttc agc gtt ggg ctc aat tca ttt gtc gtc ggg tct cag ctt ccc     6835
Ser Phe Ser Val Gly Leu Asn Ser Phe Val Val Gly Ser Gln Leu Pro
2150              2155              2160              2165
```

```
tgt gac cct gag ccc gac act gag gta gtg atg tcc atg cta aca gac     6883
Cys Asp Pro Glu Pro Asp Thr Glu Val Val Met Ser Met Leu Thr Asp
            2170              2175              2180
```

```
cca tcc cat atc acg gcg gag gct gca gcg cgg cgt tta gcg cgg ggg     6931
Pro Ser His Ile Thr Ala Glu Ala Ala Ala Arg Arg Leu Ala Arg Gly
            2185              2190              2195
```

```
tca ccc cca tct gag gca agc tcc tca gcg agc cag ctg tcg gcg cca     6979
Ser Pro Pro Ser Glu Ala Ser Ser Ser Ala Ser Gln Leu Ser Ala Pro
        2200              2205              2210
```

```
tcg ctg cga gcc acc tgc acc acc cac ggt agg acc tat gat gtg gac     7027
Ser Leu Arg Ala Thr Cys Thr Thr His Gly Arg Thr Tyr Asp Val Asp
    2215              2220              2225
```

```
atg gtg gat gcc aac ctg ttc atg ggg ggc ggc gtg att cgg ata gag     7075
Met Val Asp Ala Asn Leu Phe Met Gly Gly Gly Val Ile Arg Ile Glu
2230              2235              2240              2245
```

```
tct gag tcc aaa gtg gtc gtt ctg gac tcc ctc gac tca atg acc gag     7123
Ser Glu Ser Lys Val Val Val Leu Asp Ser Leu Asp Ser Met Thr Glu
            2250              2255              2260
```

```
gaa gag ggc gac ctt gag cct tca gta cca tcg gag tat atg ctc ccc     7171
Glu Glu Gly Asp Leu Glu Pro Ser Val Pro Ser Glu Tyr Met Leu Pro
            2265              2270              2275
```

```
agg aag agg ttc cca ccg gcc tta ccg gct tgg gcg cgg cct gat tac     7219
Arg Lys Arg Phe Pro Pro Ala Leu Pro Ala Trp Ala Arg Pro Asp Tyr
        2280              2285              2290
```

```
aac cca ccg ctt gtg gaa tcg tgg aag agg cca gat tac caa cca ccc     7267
Asn Pro Pro Leu Val Glu Ser Trp Lys Arg Pro Asp Tyr Gln Pro Pro
    2295              2300              2305
```

```
act gtt gcg ggc tgt gct ctc ccc ccc ccc aaa aag acc ccg acg cct     7315
Thr Val Ala Gly Cys Ala Leu Pro Pro Pro Lys Lys Thr Pro Thr Pro
2310              2315              2320              2325
```

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```
cct cca agg aga cgc cgg aca gtg ggt ctg agc gag agc acc ata gga    7363
Pro Pro Arg Arg Arg Arg Thr Val Gly Leu Ser Glu Ser Thr Ile Gly
            2330                2335                2340

gat gcc ctc caa cag ctg gcc atc aag tcc ttt ggc cag ccc ccc cca    7411
Asp Ala Leu Gln Gln Leu Ala Ile Lys Ser Phe Gly Gln Pro Pro Pro
            2345                2350                2355

agc ggc gat tca ggc ctt tcc acg ggg gcg gac gcc gcc gac tcc ggc    7459
Ser Gly Asp Ser Gly Leu Ser Thr Gly Ala Asp Ala Ala Asp Ser Gly
            2360                2365                2370

gat cgg aca ccc cct gac gag ttg gct ctt tcg gag aca ggt tct acc    7507
Asp Arg Thr Pro Pro Asp Glu Leu Ala Leu Ser Glu Thr Gly Ser Thr
        2375                2380                2385

tcc tcc atg ccc ccc ctc gag ggg gag cct ggg gac cca gac ctg gag    7555
Ser Ser Met Pro Pro Leu Glu Gly Glu Pro Gly Asp Pro Asp Leu Glu
2390                2395                2400                2405

cct gag cag gta gag ctt caa cct cct ccc cag ggg ggg gag gca gct    7603
Pro Glu Gln Val Glu Leu Gln Pro Pro Pro Gln Gly Gly Glu Ala Ala
                2410                2415                2420

ccc ggc tcg gac tcg ggg tcc tgg tct act tgc tcc gag gag gat gac    7651
Pro Gly Ser Asp Ser Gly Ser Trp Ser Thr Cys Ser Glu Glu Asp Asp
            2425                2430                2435

tcc gtc gtg tgc tgc tcc atg tca tat tcc tgg acc ggg gct cta ata    7699
Ser Val Val Cys Cys Ser Met Ser Tyr Ser Trp Thr Gly Ala Leu Ile
            2440                2445                2450

act cct tgt agc ccc gaa gag gaa aag ttg cca att aac tcc ttg agc    7747
Thr Pro Cys Ser Pro Glu Glu Glu Lys Leu Pro Ile Asn Ser Leu Ser
        2455                2460                2465

aac tcg ctg ttg cga tac cat aac aag gta tac tgt act aca tca aag    7795
Asn Ser Leu Leu Arg Tyr His Asn Lys Val Tyr Cys Thr Thr Ser Lys
2470                2475                2480                2485

agt gcc tca cta agg gct aaa aag gta act ttt gat agg atg caa gtg    7843
Ser Ala Ser Leu Arg Ala Lys Lys Val Thr Phe Asp Arg Met Gln Val
            2490                2495                2500

ctc gac gcc tat tat gat tca gtc tta aag gac atc aag cta gcg gcc    7891
Leu Asp Ala Tyr Tyr Asp Ser Val Leu Lys Asp Ile Lys Leu Ala Ala
            2505                2510                2515

tcc aag gtc agc gca agg ctc ctc acc tta gag gag gcg tgc caa ttg    7939
Ser Lys Val Ser Ala Arg Leu Leu Thr Leu Glu Glu Ala Cys Gln Leu
            2520                2525                2530

acc cca ccc cac tct gca aga tcc aag tat ggg ttt ggg gct aag gag    7987
Thr Pro Pro His Ser Ala Arg Ser Lys Tyr Gly Phe Gly Ala Lys Glu
    2535                2540                2545
```

```
gtc cgc agc ttg tcc ggg agg gcc gtc aac cac atc aag tcc gtg tgg          8035
Val Arg Ser Leu Ser Gly Arg Ala Val Asn His Ile Lys Ser Val Trp
2550           2555               2560               2565

aag gac ctc ttg gaa gac tca caa aca cca att cct aca acc atc atg          8083
Lys Asp Leu Leu Glu Asp Ser Gln Thr Pro Ile Pro Thr Thr Ile Met
            2570               2575               2580

gcc aaa aat gag gtg ttc tgc gtg gac ccc gcc aag ggg ggt aaa aaa          8131
Ala Lys Asn Glu Val Phe Cys Val Asp Pro Ala Lys Gly Gly Lys Lys
            2585               2590               2595

cca gct cgc ctt atc gtt tac cct gac ctc ggc gtc agg gtc tgc gag          8179
Pro Ala Arg Leu Ile Val Tyr Pro Asp Leu Gly Val Arg Val Cys Glu
            2600               2605               2610

aag atg gcc ctt tat gat gtc aca caa aag ctt cct cag gcg gtg atg          8227
Lys Met Ala Leu Tyr Asp Val Thr Gln Lys Leu Pro Gln Ala Val Met
        2615               2620               2625

ggg gct tct tat ggc ttc cag tac tcc ccc gct cag cgg gtg gag ttt          8275
Gly Ala Ser Tyr Gly Phe Gln Tyr Ser Pro Ala Gln Arg Val Glu Phe
2630           2635               2640               2645

ctc ttg aag gca tgg gcg gaa aag aga gac cct atg ggt ttt tcg tat          8323
Leu Leu Lys Ala Trp Ala Glu Lys Arg Asp Pro Met Gly Phe Ser Tyr
            2650               2655               2660

gat acc cga tgc ttt gac tca acc gtc act gag aga gac atc agg act          8371
Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Arg Asp Ile Arg Thr
            2665               2670               2675

gag gag tcc ata tac cag gcc tgc tcc tta ccc gag gag gcc cga act          8419
Glu Glu Ser Ile Tyr Gln Ala Cys Ser Leu Pro Glu Glu Ala Arg Thr
            2680               2685               2690

gcc ata cac tcg ctg act gag aga ctc tat gtg gga ggg ccc atg ttc          8467
Ala Ile His Ser Leu Thr Glu Arg Leu Tyr Val Gly Gly Pro Met Phe
        2695               2700               2705

aac agc aag ggc cag tcc tgc ggg tac agg cgt tgc cgc gcc agc ggg          8515
Asn Ser Lys Gly Gln Ser Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly
2710           2715               2720               2725

gtg ctt acc act agt atg ggg aac acc atc aca tgc tat gta aaa gcc          8563
Val Leu Thr Thr Ser Met Gly Asn Thr Ile Thr Cys Tyr Val Lys Ala
            2730               2735               2740

cta gcg gct tgc aag gct gcg ggg ata att gcg ccc acg atg ctg gta          8611
Leu Ala Ala Cys Lys Ala Ala Gly Ile Ile Ala Pro Thr Met Leu Val
            2745               2750               2755

tgc ggc gac gac ttg gtc gtc atc tca gaa agc cag ggg act gag gag          8659
Cys Gly Asp Asp Leu Val Val Ile Ser Glu Ser Gln Gly Thr Glu Glu
            2760               2765               2770

gac gag cgg aac ctg aga gcc ttc acg gag gct atg acc agg tat tct          8707
```

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```
Asp Glu Arg Asn Leu Arg Ala Phe Thr Glu Ala Met Thr Arg Tyr Ser
   2775                    2780                2785


gcc cct cct ggt gac ccc ccc aga ccg gaa tat gac ctg gag cta ata    8755
Ala Pro Pro Gly Asp Pro Pro Arg Pro Glu Tyr Asp Leu Glu Leu Ile
2790                2795                2800                2805


aca tct tgt tcc tca aac gtg tct gtg gca ctt ggc cca cag ggc cgc    8803
Thr Ser Cys Ser Ser Asn Val Ser Val Ala Leu Gly Pro Gln Gly Arg
               2810                2815                2820


cgc aga tac tac ctg acc aga gac ccc acc act tca att gcc cgg gct    8851
Arg Arg Tyr Tyr Leu Thr Arg Asp Pro Thr Thr Ser Ile Ala Arg Ala
               2825                2830                2835


gcc tgg gaa aca gtt aga cac tcc cct gtc aat tca tgg ctg gga aac    8899
Ala Trp Glu Thr Val Arg His Ser Pro Val Asn Ser Trp Leu Gly Asn
           2840                2845                2850


atc atc cag tac gct cca acc ata tgg gtt cgc atg gtc ctg atg aca    8947
Ile Ile Gln Tyr Ala Pro Thr Ile Trp Val Arg Met Val Leu Met Thr
   2855                2860                2865


cac ttc ttc tcc att ctc atg gcc cag gac acc cta gac cag aac ctt    8995
His Phe Phe Ser Ile Leu Met Ala Gln Asp Thr Leu Asp Gln Asn Leu
2870                2875                2880                2885


aac ttt gaa atg tac gga tcg gtg tac tcc gtg agt cct ctg gac ctc    9043
Asn Phe Glu Met Tyr Gly Ser Val Tyr Ser Val Ser Pro Leu Asp Leu
               2890                2895                2900


cca gcc ata att gaa agg tta cac ggg ctt gac gcc ttc tct ctg cac    9091
Pro Ala Ile Ile Glu Arg Leu His Gly Leu Asp Ala Phe Ser Leu His
               2905                2910                2915


aca tac act ccc cac gaa ctg acg cgg gtg gct tca gcc ctc aga aaa    9139
Thr Tyr Thr Pro His Glu Leu Thr Arg Val Ala Ser Ala Leu Arg Lys
           2920                2925                2930


ctt ggg gcg cca ccc ctc aga gcg tgg aag agt cgg gcg cgt gca gtt    9187
Leu Gly Ala Pro Pro Leu Arg Ala Trp Lys Ser Arg Ala Arg Ala Val
   2935                2940                2945


agg gcg tcc ctc atc tcc cgt ggg ggg agg gcg gcc gtt tgc ggt cgg    9235
Arg Ala Ser Leu Ile Ser Arg Gly Gly Arg Ala Ala Val Cys Gly Arg
2950                2955                2960                2965


tac ctc ttc aac tgg gcg gtg aag acc aag ctc aaa ctc act cct ttg    9283
Tyr Leu Phe Asn Trp Ala Val Lys Thr Lys Leu Lys Leu Thr Pro Leu
               2970                2975                2980


ccg gag gca cgc ctc ctg gat ttg tcc agt tgg ttt acc gtc ggc gcc    9331
Pro Glu Ala Arg Leu Leu Asp Leu Ser Ser Trp Phe Thr Val Gly Ala
               2985                2990                2995


ggc ggg ggc gac att tat cac agc gtg tcg cgt gcc cga ccc cgc cta    9379
Gly Gly Gly Asp Ile Tyr His Ser Val Ser Arg Ala Arg Pro Arg Leu
```

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```
tta ctc ctt agc cta ctc cta ctt tct gta ggg gta ggc ctc ttc cta    9427
Leu Leu Leu Ser Leu Leu Leu Leu Ser Val Gly Val Gly Leu Phe Leu
   3015                    3020                3025

ctc ccc gct cga tag agcggcacac attagctaca ctccatagct aactgttcct    9482
Leu Pro Ala Arg
3030

ttttttttt ttttttttt ttttttttt tttttttctt ttttttttt tttccctctt 9542

tcttcccttc tcatcttatt ctactttctt tcttggtggc tccatcttag ccctggtcac 9602

ggctagctgt gaaaggtccg tgagccgcat gactgcagag agtgccgtaa ctggtctctc 9662

tgcagatcat gt                                                       9674
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<210> 6
<211> 3033
<212> PRT
<213> Hepatitis C virus

<400> 6
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  1               5                  10                  15
Arg Arg Pro Gln Asp Val Lys Phe Pro Gly Gly Gly Gln Ile Val Gly
            20                  25                  30
Gly Val Tyr Leu Leu Pro Arg Arg Gly Pro Arg Leu Gly Val Arg Ala
            35                  40                  45
Thr Arg Lys Ala Ser Glu Arg Ser Gln Pro Arg Gly Arg Arg Gln Pro
       50                  55                  60
Ile Pro Lys His Arg Arg Ser Thr Gly Lys Ser Trp Gly Lys Pro Gly
  65                  70                  75                  80
Tyr Pro Trp Pro Leu Tyr Gly Asn Glu Gly Leu Gly Trp Ala Gly Trp
                  85                  90                  95
Leu Leu Ser Pro Arg Gly Ser Arg Pro Ser Trp Gly Pro Asn Asp Pro
              100                 105                 110
Arg His Arg Ser Arg Asn Val Gly Lys Val Ile Asp Thr Leu Thr Cys
          115                 120                 125
Gly Phe Ala Asp Leu Leu Gly Tyr Val Pro Val Val Gly Ala Pro Leu
      130                 135                 140
Ser Gly Val Ala Ser Ala Leu Ala His Gly Val Arg Val Leu Glu Asp
145                 150                 155                 160
Gly Val Asn Phe Ala Thr Gly Asn Leu Pro Gly Cys Ser Phe Ser Ile
              165                 170                 175
Phe Leu Leu Ala Leu Leu Ser Cys Ile Thr Thr Pro Val Ser Ala Val
          180                 185                 190
Gln Val Lys Asn Thr Ser Asn Ala Tyr Met Ala Thr Asn Asp Cys Ser
          195                 200                 205
Asn Asp Ser Ile Thr Trp Gln Leu Glu Ala Ala Val Leu His Val Pro
  210                 215                 220
Gly Cys Val Pro Cys Glu Lys Met Gly Asn Thr Ser Arg Cys Trp Ile
225                 230                 235                 240
Pro Val Ser Pro Asn Val Ala Val Arg Gln Pro Gly Ala Leu Thr Arg
              245                 250                 255
```

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```
Gly Leu Arg Thr His Ile Asp Met Val Val Leu Ser Ala Thr Leu Cys
        260                 265             270
Ser Ala Leu Tyr Val Gly Asp Leu Cys Gly Gly Val Met Leu Ala Ser
        275                 280             285
Gln Met Phe Ile Val Ser Pro Gln His His Trp Phe Val Gln Glu Cys
        290                 295             300
Asn Cys Ser Ile Tyr Pro Gly Ala Ile Thr Gly His Arg Met Ala Trp
305                 310             315                 320
Asp Met Met Met Asn Trp Ser Pro Thr Thr Thr Met Ile Leu Ala Tyr
                325             330                 335
Val Met Arg Val Pro Glu Val Ile Ile Asp Ile Ile Ser Gly Ala His
        340                 345             350
Trp Gly Val Met Phe Gly Leu Ala Tyr Phe Ser Met Gln Gly Ala Trp
        355                 360             365
Ala Lys Val Val Val Ile Leu Leu Leu Ala Ser Gly Val Asp Ala Tyr
        370                 375             380
Thr.Thr Thr Thr Gly Ser Ala Ala Gly Arg Thr Thr Ser Ser Leu Ala
385                 390             395                 400
Ser Ala Phe Ser Pro Gly Ala Arg Gln Asn Ile Gln Leu Ile Asn Thr
        405                 410             415
Asn Gly Ser Trp His Ile Asn Arg Thr Ala Leu Asn Cys Asn Asp Ser
        420                 425             430
Leu His Thr Gly Phe Phe Thr Ala Leu Phe Tyr Ile His Lys Phe Asn
        435                 440             445
Ser Ser Gly Cys Pro Glu Arg Leu Ser Ala Cys Arg Asn Ile Glu Asp
        450                 455             460
Phe Arg Ile Gly Trp Gly Ala Leu Gln Tyr Asp Asp Asn Val Thr Asn
465                 470             475                 480
Pro Glu Asp Met Arg Pro Tyr Cys Trp His Tyr Pro Pro Lys Gln Cys
                485             490                 495
Gly Val Val Pro Ala Gly Thr Val Cys Gly Pro Val Tyr Cys Phe Thr
        500                 505             510
Pro Ser Pro Val Val Val Gly Thr Thr Asp Arg Leu Gly Val Pro Thr
        515                 520             525
Tyr Thr Trp Gly Glu Asn Glu Thr Asp Val Phe Leu Leu Asn Ser Thr
        530                 535             540
Arg Pro Pro Ser Gly Ser Trp Phe Gly Cys Thr Trp Met Asn Ser Thr
545                 550             555                 560
Gly Phe Thr Lys Thr Cys Gly Ala Pro Pro Cys Arg Thr Arg Ala Asp
                565             570                 575
Phe Asn Thr Ser Thr Asp Leu Leu Cys Pro Thr Asp Cys Phe Arg Lys
                580             585                 590
His Pro Glu Ala Thr Tyr Ile Lys Cys Gly Ser Gly Pro Trp Leu Thr
        595                 600             605
Pro Lys Cys Leu Val Asp Tyr Pro Tyr Arg Leu Trp His Tyr Pro Cys
        610                 615             620
Thr Val Asn Tyr Ser Thr Phe Lys Ile Arg Met Tyr Val Gly Gly Val
625                 630             635                 640
Glu His Arg Leu Met Ala Ala Cys Asn Phe Thr Arg Gly Asp Arg Cys
                645             650                 655
Asn Leu Glu Asp Arg Asp Arg Ser Gln Gln Thr Pro Leu Leu His Ser
                660             665             670
Thr Thr Glu Trp Ala Ile Leu Pro Cys Ser Phe Ser Asp Leu Pro Ala
        675                 680             685
Leu Ser Thr Gly Leu Leu His Leu His Gln Asn Ile Val Asp Val Gln
        690                 695             700
Tyr Met Tyr Gly Leu Ser Pro Ala Leu Thr Gln Tyr Ile Val Arg Trp
```

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705                   710                   715                   720
Glu Trp Val Val Leu Leu Phe Leu Leu Leu Ala Asp Ala Arg Val Cys
                725                   730                   735
Ala Cys Leu Trp Met Leu Ile Leu Leu Gly Gln Ala Glu Ala Ala Leu
          740                   745                   750
Glu Lys Leu Val Val Leu His Ala Ala Ser Ala Ala Ser Cys Asn Gly
          755                   760                   765
Phe Leu Tyr Phe Val Ile Phe Leu Val Ala Ala Trp His Ile Lys Gly
       770                   775                   780
Arg Val Val Pro Leu Ala Ala Tyr Ser Leu Thr Gly Leu Trp Pro Phe
785                   790                   795                   800
Cys Leu Leu Leu Leu Ala Leu Pro Gln Gln Ala Tyr Ala Tyr Asp Ala
                805                   810                   815
Ser Val His Gly Gln Val Gly Ala Ala Leu Leu Val Leu Ile Thr Leu
          820                   825                   830
Phe Thr Leu Thr Pro Gly Tyr Lys Thr Leu Leu Ser Gln Ser Leu Trp
          835                   840                   845
Trp Leu Cys Tyr Leu Leu Thr Leu Ala Glu Thr Met Val Gln Glu Trp
       850                   855                   860
Ala Pro Ser Met Gln Ala Arg Gly Gly Arg Asp Gly Ile Ile Trp Ala
865                   870                   875                   880
Ala Thr Ile Phe Cys Pro Gly Val Val Phe Asp Ile Thr Lys Trp Leu
                885                   890                   895
Leu Ala Val Leu Gly Pro Gly Tyr Leu Leu Arg Gly Ala Leu Thr Arg

                900                   905                   910
Val Pro Tyr Phe Val Arg Ala His Ala Leu Leu Arg Met Cys Thr Met
          915                   920                   925
Val Arg His Leu Ala Gly Gly Arg Tyr Val Gln Met Ala Leu Leu Ala
       930                   935                   940
Leu Gly Arg Trp Thr Gly Thr Tyr Ile Tyr Asp His Leu Thr Pro Met
945                   950                   955                   960
Ser Asp Trp Ala Ala Ser Gly Leu Arg Asp Leu Ala Val Ala Val Glu
                965                   970                   975
Pro Ile Ile Phe Ser Pro Met Glu Lys Lys Val Ile Val Trp Gly Ala
          980                   985                   990
Glu Thr Ala Ala Cys Gly Asp Ile Leu His Gly Leu Pro Val Ser Ala
          995                  1000                  1005
Arg Leu Gly Arg Glu Ile Leu Leu Gly Pro Ala Asp Gly Tyr Thr Ser
       1010                  1015                  1020
Lys Gly Trp Lys Leu Leu Ala Pro Ile Thr Ala Tyr Ala Gln Gln Thr
1025                  1030                  1035                  1040
Arg Gly Leu Leu Gly Ser Ile Val Val Ser Met Thr Gly Arg Asp Lys
                1045                  1050                  1055
Thr Glu Gln Ala Gly Glu Val Gln Val Leu Ser Thr Val Thr Gln Ser
             1060                  1065                  1070
Phe Leu Gly Thr Ser Ile Ser Gly Val Leu Trp Thr Val Tyr His Gly
          1075                  1080                  1085
Ala Gly Asn Lys Thr Leu Ala Gly Ser Arg Gly Pro Val Thr Gln Met
       1090                  1095                  1100
Tyr Ser Ser Ala Glu Gly Asp Leu Val Gly Trp Pro Ser Pro Pro Gly
1105                  1110                  1115                  1120
Thr Lys Ser Leu Glu Pro Cys Thr Cys Gly Ala Val Asp Leu Tyr Leu
                1125                  1130                  1135
Val Thr Arg Asn Ala Asp Val Ile Pro Ala Arg Arg Arg Gly Asp Lys
             1140                  1145                  1150
Arg Gly Ala Leu Leu Ser Pro Arg Pro Leu Ser Thr Leu Lys Gly Ser
```

```
        1155                    1160                    1165
Ser Gly Gly Pro Val Leu Cys Pro Arg Gly His Ala Val Gly Ile Phe
    1170                    1175                    1180
Arg Ala Ala Val Cys Ser Arg Gly Val Ala Lys Ser Ile Asp Phe Ile
1185                    1190                    1195                    1200
Pro Val Glu Thr Leu Asp Ile Val Thr Arg Ser Pro Thr Phe Ser Asp
                1205                    1210                    1215
Asn Ser Thr Pro Pro Ala Val Pro Gln Thr Tyr Gln Val Gly Tyr Leu
            1220                    1225                    1230
His Ala Pro Thr Gly Ser Gly Lys Ser Thr Lys Val Pro Val Ala Tyr
        1235                    1240                    1245
Ala Ala Gln Gly Tyr Lys Val Leu Val Leu Asn Pro Ser Val Ala Ala
    1250                    1255                    1260
Thr Leu Gly Phe Gly Ala Tyr Leu Ser Lys Ala His Gly Ile Asn Pro
1265                    1270                    1275                    1280
Asn Ile Arg Thr Gly Val Arg Thr Val Thr Thr Gly Glu Pro Ile Thr
                1285                    1290                    1295
Tyr Ser Thr Tyr Gly Lys Phe Leu Ala Asp Gly Gly Cys Ala Gly Gly
            1300                    1305                    1310
Ala Tyr Asp Ile Ile Ile Cys Asp Glu Cys His Ser Val Asp Ala Thr
        1315                    1320                    1325
Thr Ile Leu Gly Ile Gly Thr Val Leu Asp Gln Ala Glu Thr Ala Gly
    1330                    1335                    1340
Val Arg Leu Thr Val Leu Ala Thr Ala Thr Pro Pro Gly Ser Val Thr
1345                    1350                    1355                    1360
Thr Pro His Pro Asn Ile Glu Glu Val Ala Leu Gly Gln Glu Gly Glu
                1365                    1370                    1375
Ile Pro Phe Tyr Gly Arg Ala Phe Pro Leu Ser Tyr Ile Lys Gly Gly
            1380                    1385                    1390
Arg His Leu Ile Phe Cys His Ser Lys Lys Lys Cys Asp Glu Leu Ala
        1395                    1400                    1405
Thr Ala Leu Arg Gly Met Gly Leu Asn Ala Val Ala Tyr Tyr Arg Gly
    1410                    1415                    1420
Leu Asp Val Ser Ile Ile Pro Thr Gln Gly Asp Val Val Val Val Ala
1425                    1430                    1435                    1440
Thr Asp Ala Leu Met Thr Gly Tyr Thr Gly Asp Phe Asp Ser Val Ile
                1445                    1450                    1455
Asp Cys Asn Val Ala Val Thr Gln Ala Val Asp Phe Ser Leu Asp Pro
            1460                    1465                    1470
Thr Phe Thr Ile Thr Thr Gln Thr Val Pro Gln Asp Ala Val Ser Arg
        1475                    1480                    1485
Ser Gln Arg Arg Gly Arg Thr Gly Arg Gly Arg Leu Gly Ile Tyr Arg
    1490                    1495                    1500
Tyr Val Ser Thr Gly Glu Arg Ala Ser Gly Met Phe Asp Ser Val Val
1505                    1510                    1515                    1520
Leu Cys Glu Cys Tyr Asp Ala Gly Ala Ala Trp Tyr Glu Leu Ser Pro
                1525                    1530                    1535
Val Glu Thr Thr Val Arg Leu Arg Ala Tyr Phe Asn Thr Pro Gly Leu
            1540                    1545                    1550
Pro Val Cys Gln Asp His Leu Glu Phe Trp Glu Ala Val Phe Thr Gly
        1555                    1560                    1565
Leu Thr His Ile Asp Ala His Phe Leu Ser Gln Thr Lys Gln Ser Gly
    1570                    1575                    1580
Glu Asn Phe Ala Tyr Leu Val Ala Tyr Gln Ala Thr Val Cys Ala Arg
1585                    1590                    1595                    1600
Ala Lys Ala Pro Pro Pro Ser Trp Asp Val Met Trp Lys Cys Leu Thr
            1605                    1610                    1615
```

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```
Arg Leu Lys Pro Thr Leu Val Gly Pro Thr Pro Leu Leu Tyr Arg Leu
        1620                1625                1630
Gly Ser Val Thr Asn Glu Val Thr Leu Thr His Pro Val Thr Lys Tyr
        1635                1640                1645
Ile Ala Thr Cys Met Gln Ala Asp Leu Glu Val Met Thr Ser Thr Trp
    1650                1655                1660
Val Leu Ala Gly Gly Val Leu Ala Ala Val Ala Ala Tyr Cys Leu Ala
1665                1670                1675                1680
Thr Gly Cys Val Ser Ile Ile Gly Arg Leu His Ile Asn Gln Arg Ala
            1685                1690                1695
Val Val Ala Pro Asp Lys Glu Val Leu Tyr Glu Ala Phe Asp Glu Met
        1700                1705                1710
Glu Glu Cys Ala Ser Arg Ala Ala Leu Leu Glu Glu Gly Gln Arg Ile
        1715                1720                1725
Ala Glu Met Leu Lys Ser Lys Ile Gln Gly Leu Leu Gln Gln Ala Ser
    1730                1735                1740
Lys Gln Ala Gln Asp Ile Gln Pro Ala Val Gln Ala Ser Trp Pro Lys
1745                1750                1755                1760
Met Glu Gln Phe Trp Ala Lys His Met Trp Asn Phe Ile Ser Gly Ile
            1765                1770                1775
Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn Pro Ala Val Ala
        1780                1785                1790
Ser Met Met Ala Phe Ser Ala Ala Leu Thr Ser Pro Leu Ser Thr Ser
        1795                1800                1805
Thr Thr Ile Leu Leu Asn Ile Leu Gly Gly Trp Leu Ala Ser Gln Ile
    1810                1815                1820
Ala Pro Pro Ala Gly Ala Thr Gly Phe Val Val Ser Gly Leu Val Gly
1825                1830                1835                1840
Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu
            1845                1850                1855
Ala Gly Tyr Gly Ala Gly Ile Ser Gly Ala Leu Val Ala Phe Lys Ile
        1860                1865                1870
Met Ser Gly Glu Lys Pro Ser Met Glu Asp Val Ile Asn Leu Leu Pro
        1875                  ··        1880              ↲1885
Gly Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Ile Cys Ala Ala
    1890                1895                1900
Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val Gln Trp Met
1905                1910                1915                1920
Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val Ala Pro Thr
            1925                1930                1935
His Tyr Val Thr Glu Ser Asp Ala Ser Gln Arg Val Thr Gln Leu Leu
        1940                1945                1950
Gly Ser Leu Thr Ile Thr Ser Leu Leu Arg Arg Leu His Asn Trp Ile
        1955                1960                1965
Thr Glu Asp Cys Pro Ile Pro Cys Ala Gly Ser Trp Leu Arg Asp Val
    1970                1975                1980
Trp Asp Trp Val Cys Thr Ile Leu Thr Asp Phe Lys Asn Trp Leu Thr
1985                1990                1995                2000
Ser Lys Leu Phe Pro Lys Met Pro Gly Leu Pro Phe Ile Ser Cys Gln
            2005                2010                2015
Lys Gly Tyr Lys Gly Val Trp Ala Gly Thr Gly Ile Met Thr Thr Arg
        2020                2025                2030
Cys Pro Cys Gly Ala Asn Ile Ser Gly Asn Val Arg Leu Gly Ser Met
    2035                2040                2045
Arg Ile Thr Gly Pro Lys Thr Cys Met Asn Thr Trp Gln Gly Thr Phe
    2050                2055                2060
Pro Ile Asn Cys Tyr Thr Glu Gly Gln Cys Leu Pro Lys Pro Ala Leu
```

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```
         2065                    2070                     2075                      2080
Asn Phe Lys Thr Ala Ile Trp Arg Val Ala Ala Ser Glu Tyr Ala Glu
                    2085                     2090                     2095
Val Thr Gln His Gly Ser Tyr Ala Tyr Ile Thr Gly Leu Thr Thr Asp
               2100                     2105                     2110
Asn Leu Lys Val Pro Cys Gln Leu Pro Ser Pro Glu Phe Phe Ser Trp
          2115                     2120                     2125
Val Asp Gly Val Gln Ile His Arg Ser Ala Pro Thr Pro Lys Pro Phe
       2130                     2135                     2140
Phe Arg Asp Glu Val Ser Phe Ser Val Gly Leu Asn Ser Phe Val Val
     2145                     2150                     2155                      2160
Gly Ser Gln Leu Pro Cys Asp Pro Glu Pro Asp Thr Glu Val Val Met
               2165                     2170                     2175
Ser Met Leu Thr Asp Pro Ser His Ile Thr Ala Glu Ala Ala Ala Arg
          2180                     2185                     2190
Arg Leu Ala Arg Gly Ser Pro Pro Ser Glu Ala Ser Ser Ser Ala Ser
          2195                     2200                     2205
Gln Leu Ser Ala Pro Ser Leu Arg Ala Thr Cys Thr Thr His Gly Arg
     2210                     2215                     2220
Thr Tyr Asp Val Asp Met Val Asp Ala Asn Leu Phe Met Gly Gly Gly
  2225                     2230                     2235                      2240
Val Ile Arg Ile Glu Ser Glu Ser Lys Val Val Val Leu Asp Ser Leu
               2245                     2250                     2255
Asp Ser Met Thr Glu Glu Glu Gly Asp Leu Glu Pro Ser Val Pro Ser
               2260                     2265                     2270
Glu Tyr Met Leu Pro Arg Lys Arg Phe Pro Pro Ala Leu Pro Ala Trp
          2275                     2280                     2285
Ala Arg Pro Asp Tyr Asn Pro Pro Leu Val Glu Ser Trp Lys Arg Pro
     2290                     2295                     2300
Asp Tyr Gln Pro Pro Thr Val Ala Gly Cys Ala Leu Pro Pro Pro Lys
  2305                     2310                     2315                      2320
Lys Thr Pro Thr Pro Pro Pro Arg Arg Arg Arg Thr Val Gly Leu Ser
               2325                     2330                     2335
Glu Ser Thr Ile Gly Asp Ala Leu Gln Gln Leu Ala Ile Lys Ser Phe
          2340                     2345                     2350
Gly Gln Pro Pro Pro Ser Gly Asp Ser Gly Leu Ser Thr Gly Ala Asp
     2355                     2360                     2365
Ala Ala Asp Ser Gly Asp Arg Thr Pro Pro Asp Glu Leu Ala Leu Ser
  2370                     2375                     2380
Glu Thr Gly Ser Thr Ser Ser Met Pro Pro Leu Glu Gly Glu Pro Gly
  2385                     2390                     2395                      2400
Asp Pro Asp Leu Glu Pro Glu Gln Val Glu Leu Gln Pro Pro Pro Gln
               2405                     2410                     2415
Gly Gly Glu Ala Ala Pro Gly Ser Asp Ser Gly Ser Trp Ser Thr Cys
          2420                     2425                     2430
Ser Glu Glu Asp Asp Ser Val Val Cys Cys Ser Met Ser Tyr Ser Trp
          2435                     2440                     2445
Thr Gly Ala Leu Ile Thr Pro Cys Ser Pro Glu Glu Glu Lys Leu Pro
     2450                     2455                     2460
Ile Asn Ser Leu Ser Asn Ser Leu Leu Arg Tyr His Asn Lys Val Tyr
  2465                     2470                     2475                      2480
Cys Thr Thr Ser Lys Ser Ala Ser Leu Arg Ala Lys Lys Val Thr Phe
               2485                     2490                     2495
Asp Arg Met Gln Val Leu Asp Ala Tyr Tyr Asp Ser Val Leu Lys Asp
          2500                     2505                     2510
Ile Lys Leu Ala Ala Ser Lys Val Ser Ala Arg Leu Leu Thr Leu Glu
     2515                     2520                     2525
```

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```
Glu Ala Cys Gln Leu Thr Pro Pro His Ser Ala Arg Ser Lys Tyr Gly
    2530                2535                2540
Phe Gly Ala Lys Glu Val Arg Ser Leu Ser Gly Arg Ala Val Asn His
2545                2550                2555                2560
Ile Lys Ser Val Trp Lys Asp Leu Leu Glu Asp Ser Gln Thr Pro Ile
            2565                2570                2575
Pro Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Asp Pro Ala
            2580                2585                2590
Lys Gly Gly Lys Lys Pro Ala Arg Leu Ile Val Tyr Pro Asp Leu Gly
            2595                2600                2605
Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Val Thr Gln Lys Leu
    2610                2615                2620
Pro Gln Ala Val Met Gly Ala Ser Tyr Gly Phe Gln Tyr Ser Pro Ala
2625                2630                2635                2640
Gln Arg Val Glu Phe Leu Leu Lys Ala Trp Ala Glu Lys Arg Asp Pro
            2645                2650                2655
Met Gly Phe Ser Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu
            2660                2665                2670
Arg Asp Ile Arg Thr Glu Glu Ser Ile Tyr Gln Ala Cys Ser Leu Pro
        2675                2680                2685
Glu Glu Ala Arg Thr Ala Ile His Ser Leu Thr Glu Arg Leu Tyr Val
    2690                2695                2700
Gly Gly Pro Met Phe Asn Ser Lys Gly Gln Ser Cys Gly Tyr Arg Arg
2705                2710                2715                2720
Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Met Gly Asn Thr Ile Thr
            2725                2730                2735
Cys Tyr Val Lys Ala Leu Ala Ala Cys Lys Ala Ala Gly Ile Ile Ala
            2740                2745                2750
Pro Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Ser Glu Ser
        2755                2760                2765
Gln Gly Thr Glu Glu Asp Glu Arg Asn Leu Arg Ala Phe Thr Glu Ala
2770                2775                2780
Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Arg Pro Glu Tyr
2785            ·        2790                2795                2800
Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala Leu
            2805                2810                2815
Gly Pro Gln Gly Arg Arg Arg Tyr Tyr Leu Thr Arg Asp Pro Thr Thr
            2820                2825                2830
Ser Ile Ala Arg Ala Ala Trp Glu Thr Val Arg His Ser Pro Val Asn
        2835                2840                2845
Ser Trp Leu Gly Asn Ile Ile Gln Tyr Ala Pro Thr Ile Trp Val Arg
    2850                2855                2860
Met Val Leu Met Thr His Phe Phe Ser Ile Leu Met Ala Gln Asp Thr
2865                2870                2875                2880
Leu Asp Gln Asn Leu Asn Phe Glu Met Tyr Gly Ser Val Tyr Ser Val
            2885                2890                2895
Ser Pro Leu Asp Leu Pro Ala Ile Ile Glu Arg Leu His Gly Leu Asp
            2900                2905                2910
Ala Phe Ser Leu His Thr Tyr Thr Pro His Glu Leu Thr Arg Val Ala
    2915                2920                2925
Ser Ala Leu Arg Lys Leu Gly Ala Pro Pro Leu Arg Ala Trp Lys Ser
    2930                2935                2940
Arg Ala Arg Ala Val Arg Ala Ser Leu Ile Ser Arg Gly Gly Arg Ala

2945                2950                2955                2960
Ala Val Cys Gly Arg Tyr Leu Phe Asn Trp Ala Val Lys Thr Lys Leu
            2965                2970                2975
```

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Lys Leu Thr Pro Leu Pro Glu Ala Arg Leu Leu Asp Leu Ser Ser Trp
          2980   2985   2990
Phe Thr Val Gly Ala Gly Gly Gly Asp Ile Tyr His Ser Val Ser Arg
       2995   3000   3005
Ala Arg Pro Arg Leu Leu Leu Leu Ser Leu Leu Leu Leu Ser Val Gly
   3010   3015   3020
Val Gly Leu Phe Leu Leu Pro Ala Arg
3025   3030

<210> 7
<211> 8024
<212> RNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: replicon

<400> 7
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cuucacgcag aaagcgccua gccauggcgu uaguaugagu gucguacagc cuccaggccc 120
cccccucccg ggagagccau aguggucugc ggaaccggug aguacaccgg aauugccggg 180
aagacugggu ccuuucuugg auaaacccac ucuaugcccg gccauuuggg cgugcccccg 240
caagacugcu agccgaguag cguuggguug cgaaaggccu ugugguacug ccugauaggg 300
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49

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51

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uccucaaaug ugucuguggc guugggcccg cggggccgcc gcagauacua ccugaccaga 7140
gacccaacca cuccacucgc ccgggcugcc ugggaaacag uuagacacuc cccuaucaau 7200
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52

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ucauggcugg gaaacaucau ccaguaugcu ccaaccauau ggguucgcau gguccuaaug 7260
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ucugcagauc augu                                                 7994


<210> 9
<211> 340
<212> RNA
<213> Artificial Sequence


<220>
<223> Description of Artificial Sequence: synthetic RNA


<400> 9
accugccccu aauaggggcg acacuccgcc augaaucacu ccccugugag gaacuacugu 60
cuucacgcag aaagcgccua gccauggcgu uaguaugagu gucguacagc cuccaggccc 120
cccccucccg ggagagccau aguggucugc ggaaccgggu aguacaccgg aauugccggg 180
aagacugggu ccuuucuugg auaaacccac ucuaugcccg gccauuuggg cgugcccccg 240
caagacugcu agccgaguag cguuggguug cgaaaggccu ugugguacug ccugauaggg 300
cgcuugcgag ugccccggga ggucucguag accgugcacc                     340


<210> 10
<211> 340
<212> RNA
<213> Artificial Sequence


<220>
<223> Description of Artificial Sequence: synthetic RNA


<400> 10
acccgccccu aauaggggcg acacuccgcc augaaucacu ccccugugag gaacuacugu 60
cuucacgcag aaagcgucua gccauggcgu uaguaugagu gucguacagc cuccaggccc 120
cccccucccg ggagagccau aguggucugc ggaaccgggu aguacaccgg aauugccggg 180
aagacugggu ccuuucuugg auaaacccac ucuaugcccg gccauuuggg cgugcccccg 240
caagacugcu agccgaguag cguuggguug cgaaaggccu ugugguacug ccugauaggg 300
ugcuugcgag ugccccggga ggucucguag accgugcacc                     340


<210> 11
<211> 236
<212> RNA
<213> Artificial Sequence


<220>
<223> Description of Artificial Sequence: synthetic RNA
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53

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<400> 11
agcggcacac acuagguaca cuccauagcu aacuguuccu uuuuuuuuuu uuuuuuuuuu 60
uuuuuuuuuu uuuuuuuuuu uucuuuuuuu uuuuuuuccc ucuuucuucc cuucucaucu 120
uauucuacuu ucuuucuugg uggcuccauc uuagcccuag ucacggcuag cugugaaagg 180
uccgugagcc gcaugacugc agagagugcc guaacugguc ucucugcaga ucaugu 236


<210> 12
<211> 232
<212> RNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic RNA

<400> 12
agcggcacac auuagcuaca cuccauagcu aacuguuccu uuuuuuuuuu uuuuuuuuuu 60
uuuuuuuuuu uuuuuuucuu uuuuuuuuuu uuucccucuu ucuucccuuc ucaucuuauu 120
cuacuuucuu ucuugguggc uccaucuuag cccuggucac ggcuagcugu gaaagguccg 180
ugagccgcau gacugcagag agugccguaa cuggucucuc ugcagaucau gu 232


<210> 13
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 13
cgggagagcc atagtgg                                                  17


<210> 14
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 14
agtaccacaa ggcctttcg                                                19


<210> 15
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 15
ctgcggaacc ggtgagtaca c                                             21
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<210> 16
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 16
aacaagatgg attgcacgca   20

<210> 17
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 17
cgtcaagaag gcgatagaag   20

<210> 18
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 18
gcactctctg cagtcatgcg gctcacggac   30

<210> 19
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 19
cccctgtgag gaactactgt cttcacgc   28

<210> 20
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 20
ccgggagagc catagtggtc tgcg   24

<210> 21
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 21
ccactcaaag aaaaagtgtg acgagctcgc   30

<210> 22
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 22
ggcttgggca cggcctga   18

<210> 23
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 23
gcggtgaaga ccaagctcaa actcactcca   30

<210> 24
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 24
agaacctgcg tgcaatccat c   21

<210> 25
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 25
cccgtcatga gggcgtcggt ggc   23

<210> 26
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 26
accagcaacg gtgggcggtt ggtaatc   27

<210> 27
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 27
ggcacgcgac acgctgtg   18

<210> 28
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: synthetic DNA

<400> 28
agctagccgt gactagggct aagatggagc   30

<210> 29
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:synthetic
     DNA(primer)

<400> 29
aacaagatgg attgcacgca   20

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<210> 30
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:synthetic
      DNA(primer)

<400> 30
cgtcaagaag gcgatagaag                                      20


<210> 31
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:synthetic DNA

<400> 31
gcactctctg cagtcatgcg gctcacggac                           30


<210> 32
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:synthetic DNA

<400> 32
cccctgtgag gaactactgt cttcacgc                             28


<210> 33
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence::synthetic DNA

<400> 33
ccgggagagc catagtggtc tgcg                                 24


<210> 34
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence::synthetic DNA
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```
<400> 34
ccactcaaag aaaaagtgtg acgagctcgc                                    30


<210> 35
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:synthetic
      DNA(primer)

<400> 35
ggcttgggca cggcctga                                                 18


<210> 36
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence::synthetic DNA

<400> 36
gcggtgaaga ccaagctcaa actcactcca                                    30


<210> 37
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence::synthetic DNA

<400> 37
agaacctgcg tgcaatccat c                                             21


<210> 38
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence::synthetic DNA

<400> 38
cccgtcatga gggcgtcggt ggc                                           23


<210> 39
<211> 27
<212> DNA
<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence::synthetic DNA

<400> 39
accagcaacg gtgggcggtt ggtaatc   27

<210> 40
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence::synthetic DNA

<400> 40
ggaacgcgac acgctgtg   18

<210> 41
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence::synthetic DNA

<400> 41
agctagccgt gactagggct aagatggagc   30